THE POLITICAL ECONOMY OF DELAY:

SITING ENERGY POWER PLANTS IN JAPAN

by

Sidney Hayden Lesbirel

A Thesis Submitted for the Degree
of Doctor of Philosophy
at the Research School of Pacific Studies,
Australian National University

May 1985

This thesis is based on original research I conducted in the Australia-Japan Research Centre, Research School of Pacific Studies, Australian National University.

S. Hayden Lesbirel

ABSTRACT

This thesis examines the factors influencing the variation in the leadtimes to site and construct nuclear and fossil-fuelled power plants in Japan. It develops a framework for evaluating the times necessary to reach social and political agreement over the construction of power plants. The study stresses the importance of distributional influences and, hence, the need to examine the effectiveness of compensation mechanisms in evaluating why some projects take longer to implement than others. Several hypotheses, which take into account the relative importance of distributional factors and other 'non-economic' influences on the speed at which agreement can be reached over the development of energy projects, are investigated.

The empirical analysis is based on an examination of quantitative data covering all large-scale power plant sitings in Japan from 1960-1979 and four case studies on siting disputes. It allows generalisation about the critical influences on project leadtimes. Four major conclusions emerge from the study. First, the variation in public acceptance times contributes more significantly to the variation in total power plant leadtimes than licensing and construction times. The predictability of project leadtimes increases substantially after public acceptance has been negotiated. Second, econometric models which consider distributional effects, defined as: expected electricity

shortages, the extent of regional social and economic opportunities, the size of the rural sector, the ability of local government to provide public goods, the strength of prefectural leftist political parties, prevailing local community and social attitudes and relative risk of different types of projects are useful in explaining a major part of the variation in settlement times. Models which capture these influences at the beginning of the negotiating process are useful, but the evaluation of settlement times can be improved by monitoring carefully these variables during the course of settlement. Third, the development of a comprehensive framework for explaining siting delays requires going beyond the use of simple statistical models. It requires an assessment of political and institutional factors, changing expectations and uncertainty about outcomes. The predictability of public acceptance times can be enhanced by taking these factors in account explicitly. Fourth, the approach adopted in the thesis and the identification of the more general influences suggest that it is possible to develop better ways of evaluating leadtimes for economic projects in general than have been commonly used in the past.

ACKNOWLEDGEMENTS

This thesis extends earlier Honours work undertaken in the School of Modern Asian Studies (MAS) at Griffith University in 1980. Dr Nancy Viviani, at present on leave from the School to the Social Development Division for Asia and the Pacific, United Nations, and Dr Peter Drysdale, Executive Director of the Australia-Japan Research Centre supervised that work and encouraged me to proceed to post-graduate study.

The supervision for this thesis was provided by Dr Peter Drysdale, Professor Stuart Harris, formerly Director of the Centre for Resource and Environmental Studies and now Secretary of the Department of Foreign Affairs and Mr. Ben Smith of the Department of Economics. I would like to express my sincere thanks to my supervisors for their guidance on all aspects of my work. They were easily accessible and readily provided assistance from beginning to end. At all times, they saw the discussions about the thesis as an important part of my learning process in general. Dr Tom Smith of the Department of Political Science also gave me valuable assistance and acted as an important sounding board for many of my ideas.

The Research School of Pacific Studies generously supplemented a Commonwealth Scholarship to enable me to spend a year in Japan to conduct fieldwork. Without that additional financial assistance, the case study work of the thesis, which required visiting a number of local electorates, would not have been possible.

The Institute of Energy Economics provided the institutional base from which I completed the fieldwork component of my program. Dr Toyoaki Ikuta, President of the Institute, made every effort to make my stay academically productive and personally enjoyable. Mr Shinji Suzuki, Deputy Director of the Planning Section, kindly spared a considerable amount of his time discussing issues relevant to my research. Ms Hiroka Nishikawa assisted in arranging interviews, typing thank-you letters and all those duties which are critical to successfully completing fieldwork.

Numerous other people, all of whom cannot be mentioned, helped me in Japan. Special thanks go to the General Managers of the Siting and Environmental Sections of the nine electric power companies, the Japan Atomic Power Company and the Electric Power Development Company for collating an enormous amount of data on power plant leadtimes. That data is not readily available in Japan and they responded very quickly and efficiently to questionnaires that I sent to them. I also wish to thank Mr Yoshino Ichiryu, Director of the Electric Power Siting Office in the Agency for Natural Resources and Energy, Ministry of International Trade and Industry, for organising the collection of local community data not available in Tokyo. Many other people from all levels of government and both sides of the political spectrum kindly devoted their time and energy to helping me in Japan and providing valuable insights into my work.

Ms Prue Phillips of the Australia-ASEAN Project provided instruction on the statistical component of my research. She wrote all the programs to execute the quantitative analysis and effectively provided the necessary crash course in statistics and computing. Colin McKenzie, a fellow student in the Department of Statistics, also gave freely of his time to assist in my thinking about the statistical part of my research.

The final editing of the thesis was conducted after taking up a lectureship in MAS at Griffith University. I wish to thank Mr Peter Davis, a close friend of mine in the Department of Physics at the University of Queensland, for providing valuable assistance and encouragement at a time when he had more important commitments on his plate. I would also like to express my gratitude to Dr Robert Cribb and Dr Colin Brown, two of my colleagues in MAS, for assisting me in the final stages of the thesis.

Mrs Beverley Hargreaves cheerfully and meticulously typed the bulk of what was a scarcely legible manuscript. Her expertise facilitated the delivery of an initial draft of the thesis when time had a high premium. Mrs Minni Reis completed the major part of the final version of the manuscript and displayed a huge amount of patience and understanding as the deadline for submission edged nearer and nearer.

Finally, I would like to thank my family. This thesis is really a product of my parent's long term foresight when they forcefully propelled me in the direction of Japanese studies in my high school days. My younger brother, Stephen, and my younger sisters, Annie and Julie, gave me encouragement and support and, more importantly, love at times when it all seemed too much.

The acknowledgement of my indebtedness to the many people who assisted me should in no way obscure the fact that I alone take full responsibility for any errors or shortcomings in the study.

A NOTE ON CONFIDENTIALITY

A substantial amount of the information and data for this thesis was obtained by extensive interviewing and from receiving confidential information while undertaking fieldwork in Japan. Energy facility siting, particularly on the local level, is an extremley sensitive issue in Japan. In order to maximise the effectiveness of interviews, the author was required to give firm assurances that the identity of persons who were willing to provide information and materials would not be publisised in any way. Information received in interviews is referenced by the name of the affiliated institution and the year in which the interview was conducted.

CONTENTS

Page

Page

TABLES

FIGURES

Page

MAPS

1

THE ANALYSIS OF PROJECT DELAY

This study is concerned with the assessment of delay in locating and constructing major energy facilities. The particular focus is on the variation in times required to reach social and political agreement over the development of large-scale electric power stations in Japan. The thesis sets out to examine the patterns of resistance to and support for such developments, their impact on construction start-up times, the effectiveness of economic and other policy instruments in shortening delay, and the effect of these factors on the relative rates of expansion of different types of facilities.

The leadtimes required to develop large-scale nuclear and fossil-fuelled power stations in Japan display two important behavioural characteristics. The first is that they have, over time, become increasingly longer. The second is that they have a high degree of variability. These two characteristics suggest a considerable amount of unpredictability in the leadtimes involved in the implementation of major energy facilities. It is important to ask what are the causes of longer leadtimes and leadtime variations and whether, indeed, there may be more predictability in these variations than appears at first sight.

The Japanese electric power industry has a dual function; to site and develop power plants and to purchase fuels which are used to generate electricity at those plants. The power industry in Japan is responsible for the installation of all major energy facilities. The industry has a legal mandate to supply electricity to meet national demand for electric power. The industry is a major user of energy fuels in Japan and its role in energy use has tended to grow.

The major portion of the fuel which is used to generate electricity at power plants in Japan is secured from international energy commodity markets. Japan is not well endowed with energy resources and is 75 per cent dependent on energy imports, such as oil, coal and uranium.[1] The time required for electric power companies to develop energy facilities has important implications for the trade in energy fuels. The rate of capacity expansion, or the speed at which projects can be developed, is one major determinant of the size and pattern of energy fuel demands. Accurate assessment of energy fuel use in Japan requires, among other things, an ability to estimate the leadtime necessary to site and construct energy power projects.

Japanese energy planners, both in private power companies and in government, have had substantial difficulty in assessing the leadtime necessary to site power facilities. This is reflected in continued revisions of overall capacity targets in periods of both high and low energy demand growth. For the period 1966-1973, capacity targets were revised upwards. The predicted average annual rate of increase in the period

----

1. The remaining energy supply is made up of hydroelectric power, geothermal power, electricity generated from domestic coal and renewable sources of energy such as wind and solar energy.

was 7.9 per cent. Unexpected increases in electricity demand growth forced energy planners to develop capacity at an average rate of 11.6 per cent annually. In contrast, capacity targets were revised downward in the period 1974-1981, a period characterised by recessed electricity demand growth. The predicted average annual rate of increase was 5.4 per cent. An unexpected decline in the growth of electricity demand led to capacity only being expanded at an average annual rate of 3.7 per cent.[2]

Suppliers of energy fuels, such as those in Australia, have had no less difficulty in the assessment of capacity expansion in Japan. They have relied, to a large extent, on capacity projections supplied to them by the Japanese authorities. Revised capacity growth rates, particularly since 1973, a period of recessed energy demand growth, have caused major problems for suppliers of energy commodities. Australian suppliers have been confronted with reduced prices and this has adversely affected the profitability of the industry and heightened uncertainty about the economic viability of existing and new mines.

The trade in energy commodities, in many cases, is characterised by the existence of long term contractual arrangements.[3] The inability of consumers as well as suppliers to assess, with a reasonable degree of precision, project delivery schedules has been one factor leading to the re-negotiation of contracts. These re-negotiations have

----

2. These figures were calculated from data obtained from the Tokyo Electric Power Company, 1983.

been costly and have caused some concern in Australia about the value of such arrangements. There is, therefore, a strong interest in the provision of a better and more reliable basis for assessing capacity expansion targets published by authorities in countries reliant on traded energy fuels.

There is no standard or general framework within which the assessment of leadtime can be analysed. There is, therefore, a considerable interest in the development of an adequate framework within which the assessment of delay in implementing proposals for the placement of economic projects can be analysed in general. From this analytical perspective, the thesis aims to extend to the existing literature on project siting problems by developing a more comprehensive cost-benefit framework within which these problems can be studied. The approach developed focusses on the social and political factors that influence energy project leadtimes. The analysis stresses the importance of distributional effects and, hence, the need to examine the effectiveness of compensation mechanisms in assessing why some projects take longer to develop than others.

----

3. For an extensive discussion of these arrangements, see Smith B., 'Long-Term Contracts for the Supply of Raw Materials' in Crawford J.G. and Okita S., eds., **Australia-Japan and Western Pacific Economic Relations,** Australian Government Publishing Service, 1976, Smith B., 'Export Price Bargaining and Bilateral Monopoly in the Minerals Trade', **Economic Record**, March 1977, Smith B. and Drysdale P.D., **Stabilisation and the Reduction of Uncertainty in Bilateral Minerals Trade**, Australia-Japan Research Centre, Paper No. 65, Canberra, 1979 and Smith B., 'Bilateral Commercial Arrangments in the Energy Coal Trade' in Harris S. and Ikuta T., eds., **Australia, Japan and the Energy Coal Trade**, Australia-Japan Research Centre, Canberra, 1982.

Within this generalised framework, the study assesses the factors that cause variation in leadtimes in the development of electric power plants in Japan and analyses whether there is any predictability in these variations. It examines approximately ninety power plants in Japan. The types of energy projects considered are limited to large-scale nuclear and fossil-fuelled facilities which were developed in the period 1960-1979. The thesis covers a large proportion of existing large-scale energy power plants in Japan and, therefore, provides an extensive coverage of the problem.

Achievement of capacity targets

A major factor influencing the demand for a particular energy fuel is the amount of installed capacity that consumes that fuel.[4] The time necessary to develop energy facilities influences the rate at which capacity is capable of being increased. The leadtime to site energy projects is of crucial importance in assessments of future market opportunities for energy goods. The rate at which capacity is capable of being increased is, therefore, likely to be an important element determining market opportunities for any given type of fuel.

----

4. For a more detailed discussion of the host of factors that are likely to influence the demand for energy fuels, see Supply Demand Committee, **The Balance of Supply and Demand 1978-1990**, The Uranium Institute, London, 1979, and Neff T.L. and Jacoby H.B., **The International Uranium Market**, MIT Energy Laboratory Report, MIT-EL 80-014, Massachusetts Institute of Technology, December 1980.

Power plant leadtimes can also influence choices about the substitution of energy plants and, therefore, the mix embodied in capacity growth. The lengthening or variability of leadtimes can create uncertainty about the ability to meet expected increments to electricity demand and the cost of unexpected inflation and interest rate burdens. Promoters facing long and variable leadtimes may prefer to turn to alternate energy facilities or sources of electricity with shorter and more certain delivery times.[5]

This study addresses the question of the extent to which there is any predictability in the leadtimes involved in the siting of nuclear and fossil-fuelled power facilities in Japan. It sets out to measure leadtimes, and then to identify and analyse factors contributing to variation in leadtimes. A major objective is to provide a better and more reliable basis for assessing capacity expansion targets published by authorities in countries reliant on traded energy fuels.

Energy planners in Japan confront a considerable number of known and unknown hurdles in siting energy plants. The placement of power stations involves site selection; electricity supply-demand forecasting; and an implementation process, which comprises public acceptance, licensing and

----

5. See Lester R.K., 'Nuclear Power Plant Leadtimes' in Smart I. eds., **World Nuclear Energy - Toward a Bargain of Confidence** The John Hopkins University Press, Baltimore, 1983, initially published as a paper under the direction of the International Consultative Group on Nuclear Energy under the title of Lester R.K., **Nuclear Power Plant Leadtimes**, The Rockefeller Foundation and the Royal Institute of International Affairs, 1978.

construction. At some phases of this siting process, there is a considerable degree of predictability; at others there appears to be a higher degree of unpredictability.

Planning involves the selection of minimum cost sites, at least from the power company's perspective, when electricity supply-demand analyses suggest the need for additional capacity. Public acceptance of development of a facility at a particular site is then required. The public acceptance process involves settlement between the project promoter and the community in which the project is to be located. Public acceptance is characterised by bargaining between and among the promoters and the regional communities over the distribution of costs and benefits expected to accrue from project development. Licensing involves the settlement of finer points, such as regulation by government covering expected risks and benefits of developing facilities and, in many cases, the completion of actual negotiations over the transfer of property rights and compensation arrangements. Private companies then try to minimise construction costs subject to technical, engineering and manpower constraints.

The major source of unpredictability in project leadtimes stems from the variation in times at the front end of the siting process, where social and political settlements are reached. Leadtimes at the back end of the process, which involve licensing and construction, are relatively constant and do not appear to influence markedly variation in total leadtimes. Confidence in the prediction of leadtime increases substantially after public acceptance has been negotiated.

Hence, the attainability of capacity targets appears to be influenced heavily by the outcome of social and political bargaining processes at the regional level. This provides a focus for interpretation of the nature of bargaining between and among promoters and regional communities over the construction of electric power stations. A major interest is in identifying and analysing the social, economic and political conditions which determine the pattern of resistance to and acquiescence in project development, their impact on settlement times, and the effectiveness of economic and political instruments in influencing bargaining outcomes and the speed of settlement.

Analytical interest

There is an interest in developing a framework which will allow for the assessment of delay in the implementation of proposals for economic projects in general. The existing literature on the siting of economic projects, such as energy facilities, provides an incomplete framework for the analysis of these problems. The literature on the siting of energy projects covers a wide range of issues, reflecting the many dimensions there are to this issue, but there is no general or standard approach. Analyses, in both English and Japanese, range from examinations of the engineering feasibility of locating plants on offshore flotillas to the risks of potential environmental hazards. Over the past decade, there has been a proliferation of studies on energy project siting. Very few of these studies, however, have asked what factors determine the leadtimes necessary to locate and construct energy facilities.[6]

In 1976, Jopling[7] developed a model of public resistance to the siting of nuclear power plants in the United States. Jopling identifies seven stages which he considered useful in assessing social resistance to the siting of nuclear energy facilities. They are public disclosure of the proposal, expert inquiry, information distribution, organisation of citizens, technical disagreement, uncompromising conflict and legal confrontation. Four case studies are used to develop generalisations about the stages involved in locating nuclear power plants.

Jopling's major conclusion is that the occurrence of political conflict over nuclear power plant siting at any one particular location can have important spillover effects onto other areas where plants are being located or are to be subsequently located. This implies that resistance to a particular nuclear plant in one locality is likely to lead to a similiar type of resistance at other areas toward the construction of nuclear plants. Indeed, disputes over the siting of a nuclear project at any one specific location can influence the outcomes of settlement at other regions.

----

6. For a comprehensive survey of the literature on energy plant siting, see Hamilton M.S., 'Power Plant Siting: A Literature Review', **Natural Resources Journal**, Vol.19, January, 1979.

7. Jopling R.G., et al., 'Forecasting Public Resistance to Technology; The Example of Nuclear Power Reactor Siting' in Bright J.R. and Schoeman M.E.F., **A Guide to Practical Technology Forecasting**, Prentice Hall, New Jersey, 1973.

For example, regional interests may use tactics employed in previous siting disputes to try to influence bargaining outcomes.

The empirical evidence presented by Jopling, however, is limited to nuclear projects ultimately abandoned. There are a number of nuclear projects which have been withdrawn in Japan and there is an interest in considering the factors which caused their abandonment. The model developed by Jopling, however, appears to be of limited use in explaining the operation of a large number of nuclear projects in the United States and elsewhere and in predicting the varying degrees of difficulty in reaching settlements over the development of projects and the leadtimes involved in their placement.

In a seminal study, Lester[8] compares leadtime experience in siting nuclear power plants in Japan, West Germany, Canada and the United States. Lester suggests that trends towards longer leadtimes can increase the cost of nuclear plants and reduce the economic competitiveness of nuclear power relative to other energy sources. Lester provides some measure of average total leadtimes, but these are rough in the sense that total leadtime is not clearly defined. Also he does not distinguish clearly different stages involved in siting nuclear plants. He clearly defines and provides data on a composite licensing-construction stage, but only provides rough estimates of public acceptance times. Lester does not highlight important behavioural patterns

----

8. Lester, R.K., **op.cit.**, pp.3-5.

for different stages of the siting process and the relative importance of these stages in contributing to increased leadtimes and variation in those leadtimes.

Lester provides a useful taxonomy of the host of complex and interrelated factors which appear to determine leadtimes. He concludes that trends towards increasing leadtimes are attributable to technical factors, such as expanded plant size, increased safety and environmental regulations and the growing involvement of local authorities in decision-making processes. Lester notes that his study does not attempt to measure the relative importance of these factors in explaining increased nuclear power plant leadtimes.

Since Lester's work, two studies have attempted to consider, explicitly, the factors influencing variation in leadtimes for energy projects in Japan. The first was by the present author[9] in 1980. The second was a study commissioned by the National Institute of Research and Advancement (NIRA) to the Japan Statistical Centre (JSC) which was completed under the direction of Tamura of Kobe University[10] in 1981. Both these studies develop approaches for providing quantitative estimates of the important factors associated with leadtime behaviour in Japan; the former concentrating on public

----

9. Lesbirel S.H., **Factors Influencing Long Term Uranium Demand in Japan with Special Reference to Nuclear Siting**, unpublished Honours Thesis, Griffith University, Brisbane, 1980.

10. Nihon tōkei sentaa, **Enerugii shisetsu no richi o meguru funsō no kenkyū** [Research on Disputes over the Siting of Power Plants in Japan], Sōgō kenkyū kaihatsu kikō josei kenkyū: NRS-80-6, San arima, Tokyo, 1981.

acceptance leadtimes and the latter focussing on total leadtimes.

Lesbirel correlates a public acceptance leadtime variable with a variety of explanatory variables which illustrate the social, economic and political characteristics of regions where nuclear power plants have been sited. The work concludes that the nature of the prefectural economy is the most important variable explaining variation in public acceptance times. Evidence is provided to support three major hypotheses. First, public acceptance appears to be longer in prefectures where the economic outlook is relatively optimistic. Second, settlements tend to be more difficult in areas which are relatively rural. Third, approval for additional reactors in areas where at least one reactor is operating appear to be shorter since regional economic development becomes dependent on continued plant construction.[11]

The JSC study uses more sophisticated multiple regression techniques to provide estimates of the factors associated with variation in total leadtimes for both nuclear and fossil-fuelled power projects in Japan. The JSC study concludes that design features, such as the type of power plant, and locational characteristics are the major determinants of leadtime variation. The results of the

----

11. Richard Suttmeier of Hamilton College in New York has carefully summarised Lesbirel's major conclusions in 'The Japanese Nuclear Power Option: Technological Promise and Social Limitations' in Morse R., ed., **The Politics of Japan's Energy Strategy**, Berkeley, 1981, Chapter 5.

analysis support three major propositions. First, leadtimes for nuclear projects are longer than those for fossil-fuelled projects. Second, leadtimes tend to be shorter for siting reactors and boilers in areas which already have at least one operating. Third, total leadtime tends to be longer in situations where power plants are located on the boundaries of administrative units since the development and construction of those projects requires approval by more than one local authority.

The approaches developed by Lesbirel and the JSC contain a number of shortcomings and the results of both studies are ambiguous. There is no adequate or complete framework laid out in either study. Lesbirel attempts to conceptualise the siting process into supply and demand components; the supply side being the response of regional communities to delivering a power site and the demand side being the response of power companies to the development of projects on those sites. The study considers the factors influencing the community response to projects and the impact of that response on settlement times but does not consider the impact of promoter response on public acceptance outcomes. The JSC provides no explicit framework for the analysis and, like Lesbirel,only uses data which reflects the community response towards accepting energy projects. Both studies, by focussing solely on community responses and their impact on the variation in leadtimes, represent only partial analyses. The responses of promoters, such as private power companies and the national government, will presumably influence settlement outcomes. There is a need to extend these analyses to provide a more complete assessment of the factors influencing the variation in settlement times required to develop energy facilities.

In both studies, there are important measurement and specification problems with the leadtime and explanatory variables. The public acceptance leadtime variable used in the Lesbirel analysis is not measured accurately. Public acceptance was considered in terms of rank order of difficulty based on information received in interviews. The JSC study, in contrast, uses a total leadtime variable. This leadtime variable is, however, regressed against explanatory variables which appear to only relate to the public acceptance stage. For example, the number of persons employed in the rural sector is likely to influence public acceptance negotiations, but it will not affect the speed at which energy projects are capable of being constructed. Furthermore, the values of many explanatory variables are taken at only one point in time. For instance, the variable indicating the number of persons employed in the fishing industry is taken for the year 1978. This will not be a suitable proxy measure for assessing the role played by fishing communities on leadtimes in the 1950s and 1960s when agreement for a majority of power projects was reached. There is, therefore, a need to specify a more accurate and complete model which will be of use in the assessment of the variation in electric power plant leadtimes in Japan.

An important analytic interest in this study is in an attempt to develop a framework which will be of more general use in the assessment of settlement times. While the study is limited to energy projects developed in Japan, the approach developed should be of more general use in the assessment of settlement times for projects of other kinds in other countries. For example, the siting of mining projects in minerals and fuel supplying countries should be susceptible to the same kind of analysis. Whether one is studying the siting of highly sophisticated technological complexes, refuse tips or energy plants, the tools of analysis developed in this thesis should assist in an understanding of the determinants of delay in their placement.

A model of project delay

Cost-Benefit Analysis (CBA)[12] provides a useful theoretical entry point into the analysis of project delay. This technique specifies and then aggregates all relevant benefits and costs associated with the development of a project. It would then suggest that a project should go ahead on efficiency grounds providing a potential Pareto improvement (PPI) existed. In this context, a PPI exists if aggregate benefits exceed costs, or there is an expected economic surplus, and individuals disadvantaged by the project could, in principle, be compensated by those who were advantaged by it and still remain at least as well off

----

12. See Pearce R.W., **Cost-Benefit Analysis**, MacMillan, London, 1971, and Mishan E.J., **Cost-Benefit Analysis: An Informal Introduction**, Allen and Unwin, London, 1972. For a survey of the literature on CBA, see Prest A. and Turvey R., 'Cost-Benefit Analysis: A Survey', **Quarterly Journal of Economics**, December 1965, reprinted in **Surveys of Economic Theory**, Vol.3, MacMillan, London, 1966.

as before the change. This approach would yield a theoretical ordering of project development; projects being scheduled in accordance with net benefit-cost ratios.

A standard treatment of CBA is useful in selecting high return projects independently of the requirement for the delivery of compensation necessary in reaching social and political settlements. It would measure costs and benefits in the same way no matter to whom they accrued and would assume that compensation mechanisms were only required to take into account costs and benefits measured in this way and were operating effectively. This implies, among other things, that settlement processes are instantaneous. Settlements do, however, take time, some taking longer than others, and an important objective of the study is to ask why there is substantial variation in settlement times.

The need for a settlement process arises out of a disparity between the value of a facility to project promoters and the value to regional communities being asked to accept those projects. If both interests have veto power over placement decisions, then a settlement will involve bargaining over an acceptable distribution of costs and benefits expected to accrue from project development.[13] Promoters will be required to redistribute some of their expected gain to regional communities who expect to lose as a result of project development. Bargaining is essentially a distributive process which determines who gains from project development and the extent to which losers are compensated.

----

13. See Schelling T.C., **The Strategy of Conflict,** University, Cambridge, Massachusetts, 1979.

The development of projects confers costs and benefits on parties at various levels. These include constituencies at the national, state or prefectural and local levels of government. Those affected by project development may attempt to use economic markets, such as property rights markets, as well as political institutions to increase their share of the economic surplus expected to be generated from project development. A key objective of the study is to develop a more comprehensive cost-benefit framework which focusses on the social and political factors influencing the variation in settlement times. The framework emphasises the importance of the distribution of costs and benefits and, hence, the need to examine the adequacy of compensation mechanisms in assessing why public acceptance for certain projects takes longer than for others.

The importance of compensation in the bargaining process is that it is a major social mechanism for redistributing some of the benefits from promoters to regional communities so as to enable a settlement to be reached. Compensation in Japan is actually paid through institutional and political mechanisms aimed at facilitating the settlement process. These mechanisms take a variety of forms. First, there are institutional arrangements by which power companies pay compensation directly, either in monetary or non-monetary form, to interests, such as property right owners, who expect to be affected by a particular project. Second, there are mechanisms by which promoters, such as prefectural governments, can provide subsidies to local government in order to facilitate settlements. Third, there are arrangements by which the national community is taxed on the consumption of electricity and funds so derived are redirected to local communities to compensate for losses expected to be incurred as a result of project development.[14]

The work of Bacow[15] suggests that, although both developers and opponents of economic projects can gain from negotiating compensation arrangements, such arrangements are rarely observed in practice. He argues that compensation agreements are rare because developers find it difficult to identify interests whose consent to projects requires compensation; many of the adverse consequences of projects, such as health effects, are not easily compensatable; and, in most cases, it is impossible to bind parties to agreements that are negotiated. Bacow, therefore, suggests that compensation mechanisms do not operate effectively. The observed variability in times required to reach settlements over the development of energy projects in Japan suggests, however, that compensation mechanisms operate more or less effectively in some circumstances than in others. An important aim is to examine the nature of compensation mechanisms and the social and political factors which impede

----

14. See Chapter 2 for a more detailed explanation ofthe nature of institutionalised compensation arrangements in Japan.

15. See Bacow L.C., 'Creating Markets for Development Externalities', **MIT Energy Laboratory Working Paper,** MIT-EL 80-030WP, July 1980, and Bacow L.C. and Sanderson D.R., 'Facility Siting and Compensation: A Handbook for Communities and Developers, **MIT Energy Laboratory Working Paper,** MIT-EL 80-037WP, September 1980.

or facilitate their use in settlement processes necessary to construct energy projects.

In standard CBA, the calculation of the economic surplus expected to be generated by a given project assumes that costs and benefits are treated and measured in the same way no matter to whom they accrue. Costs and benefits may, however, be evaluated differently in different contexts. Therefore, an understanding of how costs and benefits are measured and evaluated by promoters and regional communities will be important in determining the true economic surplus and the disparity in the value of projects to promoters and regional communities.[16]

The economic surplus which is available to be redistributed in order to gain approval for project development and the structure of the distribution of costs and benefits on different interests will shape the broad bargaining environment within which the settlement process takes place. That environment may act as a positive or negative catalyst in the settlement process. Compensation mechanisms are likely to operate more effectively in situations where there is a large economic surplus available for redistribution and where the mechanisms are effectively tuned to the structure of compensation claims consequent upon a particular project

----

16. A numerical example comparing two projects A and B may help to illustrate this point. Assume that promoters of both projects value the net discounted benefits to be $20. Now suppose that, for some reason, the community being asked to accept project A weighs the costs at $15 which is 1.5 times greater than the costs of $10 assessed by the community being persuaded to accept project B. The economic surplus expected from project B will be $10 whereas the economic surplus anticipated from project A will only be $5.

development. There is considerable interest in attempting to identify the distributional effects which are likely to shape the bargaining environment and to consider their impact on settlement times.

The structure of the bargaining environment within which settlements are negotiated will be determined jointly by the value that regional communities and project promoters place on accepting and developing projects. A critical factor influencing the importance attached to projects will be an assessment and evaluation of the costs involved in the implementation of projects compared with the costs of not going ahead with those projects. The supply of project sites will be influenced by an evaluation of costs and benefits by regional communities and groups comprising those communities involved in accepting energy power plants. The demand for project sites will be affected by the value that power plant promoters, such as private power companies and the national government, place upon the development of energy projects. The disparity between the value of projects to regional communities and the value to project promoters will shape the bargaining environment in a way which either facilitates or impedes a settlement. For instance, approval may be relatively quick in situations where both promoters and regional communities assess the value of a particular project to be relatively high.

The distributional effects of projects will influence the value that is placed on the costs and benefits expected to accrue as a result of project developments. These effects will cause interests participant to the settlement to evaluate costs and benefits differently and not necessarily in a similar way as measured in standard CBA. The distributional influences, as defined in the thesis include, on the supply side: expectations about regional social and economic opportunities, the risks involved in different power plants, opportunities in the rural sector, the extent of leftist political party representation and social attitudes toward preservation of the environment and, on the demand side: expected electricity shortages.

The supply of project sites will be influenced, among other things, by the value that regional communities attach to the preservation of the prevailing state of the natural environment as well as the state of social and economic activity. The theory of environmental economics[17] provides a useful starting point for the analysis of distributional effects of energy projects and their impact on settlement times. It suggests that economic activity with potentially hazardous effects is generally found to be located in areas where social and economic opportunities, such as might be measured by the level of incomes, are relatively low. It assumes that environmental quality is a normal good, in the economic sense, so that less of that good is demanded the lower the level of social and economic opportunities. Less importance is attached to environmental costs of projects in areas where economic opportunities are low and more weight is given to the expansion of income opportunities arising

----

17. Baumol W. and Oates W., **The Theory of Environmental Policy: Externalities, Public Outlays and Environmental Policy**, Prentice-Hall, Inc., New Jersey, 1975, Chapter 13.

out of project development. Consequently, it might be expected that settlement times would be relatively shorter in these areas.

The structure of distributional effects may not only be a function of the prevailing levels of social and economic opportunities. Other factors, such as expectations regarding future social and economic opportunities, differential effects on the various communities comprising the regional polity, the risk involved in different types of projects, the ideological orientation of regional communities and prevailing social attitudes toward preserving the environment, may influence the way in which communities evaluate the costs and benefits of projects and, therefore, have an impact on settlement times.

The importance attached to the environment may also be affected by expectations about social and economic opportunities. The proposition that energy projects are more readily located in areas where opportunities are relatively low assumes that expectations about those opportunities are similar in all such areas. However, it is also likely that, other things being equal, communities would receive power stations with less enthusiasm in areas where opportunities are expected to grow rapidly independently of project development. Communities may argue that there is no need to burden themselves with additional environmental bads associated with the development of projects. Consequently, there may be more resistance to the siting of power stations.

There is, however, an alternative hypothesis that settlement times may be shorter in areas where social and economic opportunities are expected to rise rapidly. Such areas may be undergoing rapid economic growth and indeed may even be experiencing a boom in economic activity. Having experienced the benefits of growth, these communities may wish to see further expansion of rapid development. Given the prominence of benefits associated with economic growth, there may be a lag in anticipating any impairment of the environment associated with project development. An important issue addressed in this thesis is the extent to which projects are more or less easily accepted in areas undergoing rapid economic development.

Project implementation may also affect various community sectors in different ways. Site availability for large-scale nuclear and fossil-fuelled plants in Japan is generally limited to coastal areas. In these areas, rural interest groups have vested property rights which need to be exchanged in order to site energy facilities. These interest groups tend to oppose project development, sometimes adamantly. Rural interests see themselves incurring large costs, such as possible damage to primary productive capacity. At the same time, they tend to place little emphasis on the benefits of projects, such as the expansion of employment opportunities in the non-rural sector. The role of the rural sector and whether it inhibits energy facility siting is an important interest.

The risk involved in nuclear or fossil-fuelled projects may be weighed differently by regional communities.[18] Nuclear settlement times would be expected to be longer than comparable times for the siting of fossil-fuelled plants, because of the nature of nuclear technology and historical experience with the wartime use of nuclear technology in Japan. The importance of perceptions of risk as an element influencing the relative ease or difficulty in reaching settlements deserves exploration.

The perceived riskiness of projects may also depend on the degree of familiarity with power plant technologies. Power plants in Japan are concentrated in certain localities because of a general land scarcity and strong competing uses for that land. In most cases, more than one plant is located at any given site. The extent to which familiarity of project technologies affects resistance in the siting of plants in areas which already have one or more existing plants is of interest.

The structure of political party representation in regional communities may influence the relative ease or difficulty in winning agreement to locate and construct energy power plants. Leftist political parties in Japan, such as the Japanese Communist Party (JCP) and the Japanese Socialist Party (JSP) generally place a high weight on the environmental risk associated with nuclear projects and, in many cases, develop resistance movements to the siting of

----

18. For a theoretical analysis of risk, see Lowrance W., **Of Acceptable Risk: Science and the Determination of Safety**, William Kaufmann Inc., Los Altos, 1970.

those facilities. The JCP and the JSP has an important support base in the coal industry and there appears to be less leftist resistance to the development of fossil-fuelled projects. The extent to which political and ideological conflict between leftists and conservative elements is important in the determination of settlement outcomes for both nuclear and fossil-fuelled power plants is an issue to be examined.

Broad community attitudes toward the preservation of the environment and changes in those attitudes may also affect settlement times. Settlement times were relatively short in the high growth period but showed steep increases from the early 1970s. The community in Japan generally placed less emphasis on protecting the environment in the rapid economic growth period. From the late 1960s and early 1970s, there emerged a significant number of pollution problems and these problems heightened the awareness of the community in Japan toward the adverse effects of economic growth. The relationship between attitudinal changes and trends and increasing settlement times needs consideration.

The demand for project sites will be influenced by the importance promoters attach to power plants. Promoters, whether private power companies or national governments, are generally concerned with equilibrating supply and demand in electricity markets. It is likely that promoters would place a relatively high value on projects in situations where the failure to supplement existing capacity was expected to lead to electricity shortages. Where, for this or for other reasons, demand for new sites is strong, promoters could be more prepared to compensate regional communities in order to obtain their approval for project execution. Consequently, settlement times will be shorter. The relationship between expected electricity shortages and the speed at which settlements can be reached is a critical issue to be addressed.

The structure of the distribution of costs and benefits, or the way regional communities and project promoters evaluate the costs and benefits of projects, is likely to influence the speed at which settlements can be negotiated. An analysis of the distributional effects, as outlined above, will improve the understanding of the types of bargaining environments which are likely to be more or less conducive to reaching agreements over the construction of energy facilities. For example, compensation mechanisms may work more effectively in situations where promoters expect large electricity shortages and where communities evaluate the costs, including risk, associated with projects to be relatively low. Under these circumstances, there would be a larger economic surplus which could be available for redistribution from power plant promoters to regional communities.

It is useful to provide a measure of the importance of these distributional influences on the variation in settlement times required to reach agreement over the construction of energy projects. Regression methods help to model and quantify these influences which are believed to be important in the determination of settlement times. It is possible to regress a settlement leadtime variable on a number of explanatory variables which measure social and economic opportunities and promoter needs in situations where settlements have been reached. For example, it is possible to regress on leadtime, a variable indicating the share of persons employed in primary industry as a proportion of total persons employed in a particular region. This variable might be used as a proxy measure of employment opportunities in the rural sector. It might be expected that settlements would take longer in areas where the primary sector is an important source of employment in the regional economy. Under these circumstances, rural interests may place less weight on the expansion of non-rural employment opportunities arising out of project development and give more weight to the potential adverse effects on rural production due to the construction of projects.

The regression analysis provides a way of testing hypotheses relating to the impact of these distributional influences on settlement times. It indicates the proportion of variation in approval times explained by the set of explanatory variables. The analysis allows for an assessment of the importance of distributional influences in the determination of settlement times and the overall statistical significance of models aimed at explaining why agreement for some projects takes longer than for others. A necessary interest in the thesis is considering the extent to which general factors, as opposed to site-specific factors, can be identified and used in the prediction of settlement times.

The settlement process takes time. Expectations about the distribution of costs and benefits prior to the commencement of the process as well as expectations during the course of settlement are likely to be important in determining the speed of settlement. Interests involved in the settlement will assess and respond to the distribution of costs and benefits expected to accrue from the project development at a point in time when they are asked to accept a project. In the course of settlement, the expectations of those interests may change. A model can be set up to consider the responses of affected parties at the beginning of the settlement process as well as during the course of settlement and the effect on approval times. A critical question that the thesis addresses is the degree to which it is possible to assess settlement times given information about expectations prior to or at the beginning of the process and the extent to which the assessment of approval times requires the monitoring of expectations during the course of settlement.

The degree of difficulty in reaching settlements will be a function of distributional factors, such as the importance attached to environmental quality and the need to supplement existing energy capacity, which can be quantified as well as other factors which are not capable of being quantified. The regression analysis provides a way of identifying areas where distributional factors appear to be good predictors of delay and areas where they do not. It, therefore, provides a critical entry point into the analysis of the relative importance of other factors, such as uncertainty, the allocation and use of political bargaining power, strategies employed by participants in the settlement process and revised expectations, which are among the other determinants of project approval times. These factors are likely to facilitate or impede the use of compensation mechanisms and, therefore, influence the speed of settlement in a way which may not be fully or even partially capturable in any quantitative analysis. These factors are not easily susceptible to statistical measurement and can only be readily explored through detailed case history studies.

Even if the distribution of costs and benefits are fully taken into account, expected costs and benefits may not be known with certainty. Uncertainty as to the expected value of projects may influence the response of parties who are required to give their approval for project implementation. Promoters, for example, may not be willing to compensate regional communities in situations where there is uncertainty as to expected electricity demand increases and the costs of constructing projects. They may prefer to delay intentionally projects or attempt to develop alternative projects which have a more certain value. An important question the study seeks to address is the extent to which uncertainty inhibits settlements over the development of energy projects.

The variation in settlement times may not be fully explained by the structure of distributional effects even if account is taken of the effect of uncertainty. The spread of costs and benefits across interest groups needs careful analysis. Rural interest groups, such as fishing and farming co-operatives, possess property rights and, therefore, a disproportionate influence in political and economic bargaining power relative to other regional interests. The identification of powerful interest groups and the analysis of factors which determine their bargaining capacity is essential in making assessments of likely settlement outcomes.

The effectiveness of compensation mechanisms will also be influenced by the skill with which various interests, either for or against siting proposals, can successfully employ strategies aimed at influencing settlement outcomes. Promoters and organised resistance movements in Japan employ a variety of strategies to create, prevent, and disrupt necessary bargaining over compensation arrangements and the transfer of property rights. These strategies are economic, political, technical and informational in character. It is interesting and important to explore the nature and success of various bargaining strategies and the impact they have on the speed of the settlement process.

The important parameters influencing bargaining outcomes may not remain constant during the settlement process and this may inject instabilities into the bargaining process. For example, changing expectations about energy policy priorities or electricity demand growth, consequent upon some external event, may increase the value of projects to project promoters and, hence, enhance their ability to compensate adequately regional interest groups. An important element in the study is consideration of the stability of priorities and preferences during the settlement process and the way in which this affects the management of compensation.

The argument in outline

Chapter 2 sets the background to understanding the siting process in Japan. It describes the main interests and steps involved in planning, public acceptance, licensing and constructing power plants and provides measures of average leadtimes and variation in leadtimes required for each stage of project development for ninety plants in Japan. In this chapter, a way of defining accurately the major sources of unpredictability in power plant leadtimes is developed.

Chapter 3 presents more fully the framework which is used to analyse settlement times. A more comprehensive cost-benefit approach focussing on the social and political factors is outlined. The analysis stresses the importance of the distribution of costs and benefits and, hence, the need to examine the effectiveness of compensation mechanisms in understanding why some projects take longer or shorter than average times to implement. It demonstrates the possibility of quantifying the importance of distributional influences, and analysing the relative importance of other factors, such as the allocation and use of political power and changing expectations, in the determination of settlement times.

Chapters 4 to 8 comprise the empirical body of the thesis. They present quantitative results of the regression analysis and qualitative findings of the case studies. Chapter 4 presents the results of the quantitative analysis of distributional influences on the determination of settlement times. It examines the relationship between expectations about regional social and economic opportunities, the size of the rural sector, the strength of leftist political parties, the risks involved in different types of power plants and social attitudes toward the preservation of the environment and expected electricity, shortages and the time required to reach agreement over the implementation of power plants in Japan. This chapter examines the extent to which the model developed is useful in the assessment of settlement times and details qualifications which need to be made to quantitiative analysis. The quantitative analysis sets a context for the case studies which incorporate a range of other influences, such as the allocation and use of political power, the skill with which strategies are employed, changing expectations and uncertainty, which are not readily quantifiable, yet may also be important in determining the speed at which settlements can be reached.

The subsequent four chapters present detailed case histories of bargaining over the construction of electric power plants in Japan and analyse why these settlements took longer or shorter than average settlement times. Chapter 5 examines a project which was delayed and ultimately abandoned because promoters could not compensate adequately powerful regional interests groups which expected to be adversely affected by the development of the project. Chapter 6 considers the importance of the social value of projects in allowing project promoters and the prefectural political organisation to negotiate a settlement quickly and effectively with regional interests. Chapter 7 analyses the impact of revised energy policy priorities and how the national government responded to these changes in facilitating a settlement between a power company and regional interests which opposed the development of theproject. Chapter 8 highlights the impact of increasing project costs and how a project developer intentionally delayed reaching an agreement with a regional electorate.

The concluding chapter examines the degree to which settlement times are predictable and outlines the qualifications which need to be made to the use of quantitative analysis in the assessment of settlement times. This chapter presents a summary of the major findings of the study and considers the implications of these findings for those interested in making assessments of power plant settlement times. It concentrates on how the approach developed in the thesis is of more general use in assessing delay in reaching social and political settlements and suggests improvements and some ways in which future research might be developed.

THE PROCESS OF ENERGY FACILITY SITING

The placement of power stations involves a planning process which involves electricity supply and demand forecasting and site selection; and an implementation process which involves public acceptance, licensing and construction. Planning involves the selection of minimum cost sites, at least from a power company's perspective, when electricity supply-demand analyses suggest the need for additional capacity. Public acceptance of development of the facility at a particular location is then required. The public acceptance process involves settlement between the project promoters and the community in which the project is to be located. This settlement process is characterised by bargaining between and among the promoters and the regional communities over the distribution of costs and benefits expected to accrue from project development. Licensing involves the settlement of finer points, such as regulation by government covering expected risks and benefits of developing facilities and, in many cases, the completion of actual negotiations over the transfer of property rights and compensation arrangements. In the construction phase, private companies try to minimise the cost of constructing facilities, subject to manpower, technical and engineering constraints.

It is possible to identify and define starting and finishing points for each stage of project implementation. The average times and variation in those times for these stages can be measured to provide a way of assessing accurately the stage of project development which contributes most significantly to variation in total leadtimes. Judgements can then be made about the major source of unpredictability in assessing the leadtimes to locate and construct energy power plants.

Evidence is provided to support the proposition that the confidence in the assessment of leadtimes increases substantially after public acceptance has been negotiated. Energy project planners in Japan face increasingly long and highly variable leadtimes in the siting of power projects. The major source of unpredictability stems from the inability to assess accurately the outcome of bargaining processes between and among promoters and regional communities over the construction of power projects. The back end of the siting process, which involves licensing and construction, is less subject to political processes and does not appear to be a noticeable contributor to the difficulties in energy project leadtime assessment.

Major steps in energy facility siting

In principle, it is possible to identify starting and finishing points for each stage of project development, which may be regarded as decision or veto points. They represent major decisions that have to be made by relevant participants to enable a process to commence or continue

TABLE 2.1

STEPS IN SITING MAJOR ENERGY FACILITIES

Step	Process	Decision points	Major criteria
Site selection	Planning process by promoters to select minimum-cost sites	Electricity supply and demand forecasts	. flat and stable land . cooling water . population density . transportation routes . load centres
Public acceptance	Bargaining process between and among promoters and regional communities over politically acceptable allocation of costs and benefits	Formal decisions: - company decision - declaration of interest - appearance in company plans - application to site power plant - regional government invitation	. reconfirmation of site selection criteria . assessments of social and political resistance and acquiescence
Licensing	Regulatory process by government to balance risks and benefits of constructing facilities	Denchōshin [Electric power and resources development adjustment council]	. prefectural government approval . local government approval . prospects for property right transfer . environmental impact assessment (since 1974)
Construction	Optimisation process by power companies to minimise construction costs	Construction planning permit	. completion of property right transfer . necessary licences and permits . nuclear reactor establishment permit for nuclear power plants
Commercial operation		Commercial operating permit	. construction of plant . fuel loading . trial operations

Sources: Compiled from information received in 1982 in the course of interviews with national, prefectural and local government officials, electric power company personnel, and other energy experts.

for including a particular location in a pool of candidate sites:

- the existence of flat and stable terrain;
- the availability of cooling water;
- a relatively low population density;
- accessability to transportation routes; and
- proximity to load centres.[2]

An important feature of the siting process in Japan is that appropriate sites are generally only found in the coastal regions. This is because mountainous inland areas offer little in the way of flat and stable terrain, and the shallow inland rivers cannot provide sufficient cooling water. Furthermore, location in non-coastal regions is generally impractical because of difficulties in fuel loading and transporting large components necessary for construction.[3] In this respect Japan differs from the United States and some East and West European countries, where both nuclear and fossil-fuelled power plants are located inland.[4]

----

2. OECD., **Siting of Nuclear Facilities - Proceedings of a Symposium**, 9-12 December 1974, IAEA., Vienna, 1975, Toyoda M., **Genshiryoku hatsuden gijutsu dokuhon** [All You Need to Know About Nuclear Power], Oomusha, Tokyo, 1976, pp.9-12 and Information received from the Tokyo Electric Power Company, 1982.

3. The only exception to this rule is to be found in Hokkaido where some coal-fired plants are located inland. This reflects the existence of coal deposits in Hokkaido and a preference for locating some plants as close as possible to those deposits. Interviews with personnel in the Hokkaido Electric Power Company, 1983.

4. See Nihon Genshiryoku sangyō kaigi, **Genshiryoku hatsuden sho-ranhyō** [Japan's Nuclear Power Plants], Nihon genshiryoku sangyō kaigi, Tokyo, 1978, pp.13-16.

A second feature of energy plant siting in Japan is the relatively high concentration of plants at any one given site. Even though Japan has a longer coastline than the United States, site availability is limited because of competing land uses in coastal areas, so that Japanese power companies tend to concentrate plants more than is the case in other countries. For example, whereas the highest concentration of plants in England and other European countries appears to be around three to four plants per site,[5] it is not uncommon for Japanese power companies to locate as many as eight plants at a single site. Map2.1 illustrates the coastal location of major power plants in Japan and gives some indication of the degree of concentration of plants.

A major factor motivating a power company to locate additional capacity is its expected electricity supply and demand balance. Power companies make continual predictions of electricity demand, and capacity plans are based initially on these forecasts. To this forecast demand, a risk component is added to cover unexpected shortages arising from plant malfunctions and unanticipated increases in electricity demand. On the supply side, present installed capacity and capacity that will have to be shut down during the forecast period are calculated.[6] When

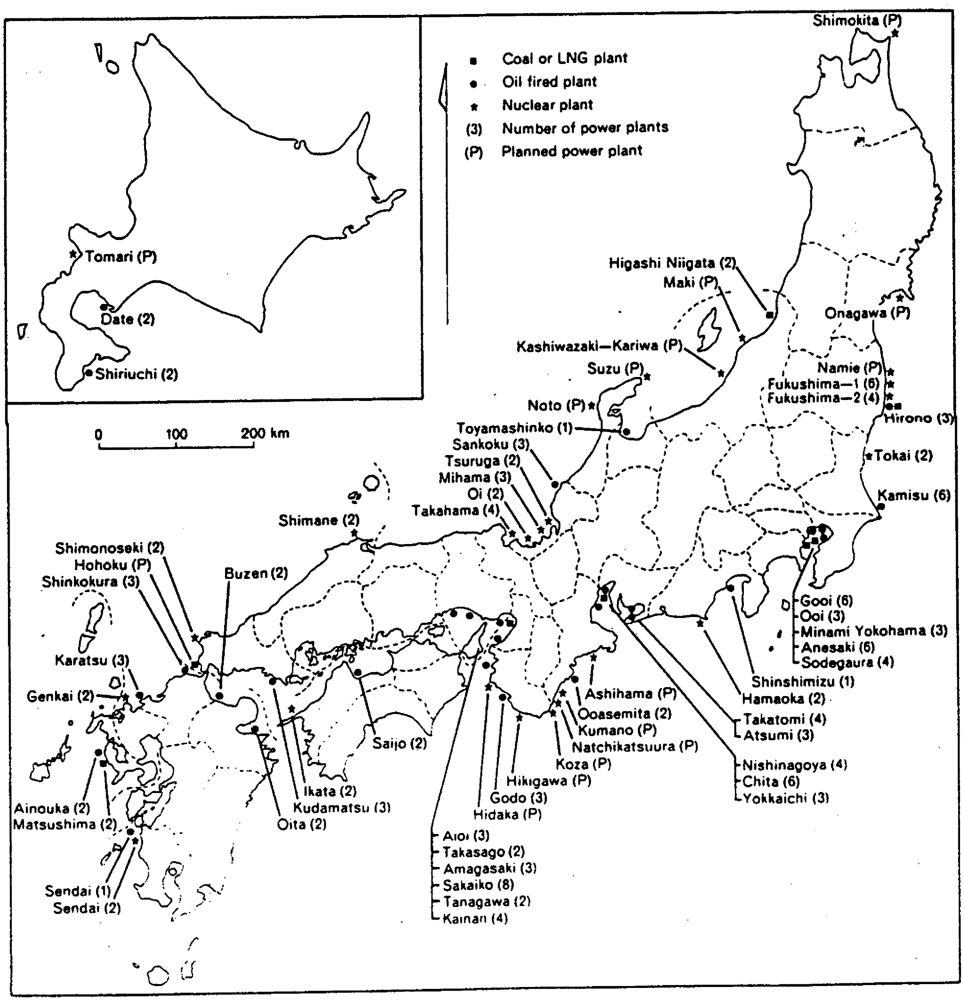
----

5. **ibid.**

6. Shin denki jigyō kōza henshu iinkai, **Denryoku keitō keikaku to unyō** [Planning and Management of Electrical Systems], Denryoku shinpōsha, Tokyo, 1980, pp.63-77.

MAP 2.1

MAJOR ENERGY FACILITIES IN JAPAN



supply and demand forecasts indicate the need for additional capacity, a power company selects a site from its pool of candidate sites.

The final choice of a site from the current pool involves selection of a minimum cost site by attaching, implicitly or explicitly, relative weightings to site selection criteria.[7] For example, where the characteristics of two candidate sites are similar except for their relative proximity to load centres, the site closest to those centres will be preferred because of the lower cost of constructing transmission lines.

Public acceptance

The site selection process culminates in a decision by the company to place a power plant at a particular location. This decision can come in a variety of forms and generally includes:

- a decision at an internal board of directors meeting;
- a declaration of intent by a power company to a regional government;
- an application for a preliminary investigation permit;

----

7. See Jopling D.G., 'Plant Site Evaluation Using Numerical Ratings', **Power Engineering**, March 1974, pp.56-59 and Amano H., **Dengen richi keikaku an sakusei shuho no kaihatsu** [Development of a Planning Model for Power Plant Siting], Kenkyū hōkoku: 577004, Denryoku chūō kenkyūjō, Tokyo, October 1977.

- the appearance of a particular location in a power company's construction plan;[8]
- an invitation by a regional government.[9]

These events usually indicate that a particular location has been selected and that an attempt will be made to reach agreement with the relevant electorate to site a power plant there.[10]

The period from a power company's decision to build an energy facility to the issue of Denchōshin approval may be regarded as the public acceptance stage. Public acceptance involves reaching broad agreement on the proposed development. More specifically, public acceptance of a project at a particular site involves settlement between the project promoters and the community in which the project is to be located, and this is achieved through a process of negotiation between and among the promoters and the regional communities. These negotiations are concerned with how the benefits of project development will be shared. Bargaining occurs between various interests on national, prefectural and local constituency levels and involves the use or

----

8. Electric power companies are required by law to submit details of construction plans to the Ministry of International Trade and Industry (MITI) on an annual basis.

9. An invitation by a regional government generally indicates that a power company has discussed the proposal with local authorities and has decided to locate a plant in that locality. Interviews with local government officials and power company personnel, 1982.

10. **ibid.**

attempted use of economic markets, such as electricity and property rights markets, and political institutions.[11]

Power company project proposals are considered by the Denchōshin Council.[12] The significance of Denchōshin approval is that agreement has been reached on the necessity for the construction of the power plant to meet expected electricity demand increases, and that there is broad consent to the proposal at the regional level. Proposals can then proceed to the licensing stage.

An important criterion for Denchōshin approval is agreement between the national government and power companies on project development. From the perspective of the supply and demand of electricity, Japan is divided into eastern, central and western spheres.[13] The national government is concerned with expanding capacity to meet expected electricity demand increases in these broad regional spheres, in contrast to power companies which are concerned with the supply of electricity to more narrowly defined power company electricity spheres. Map2.2 illustrates regional and power company electricity spheres in Japan. Projects can therefore be delayed if there are differences between regional and power company requirements for additional capacity.

----

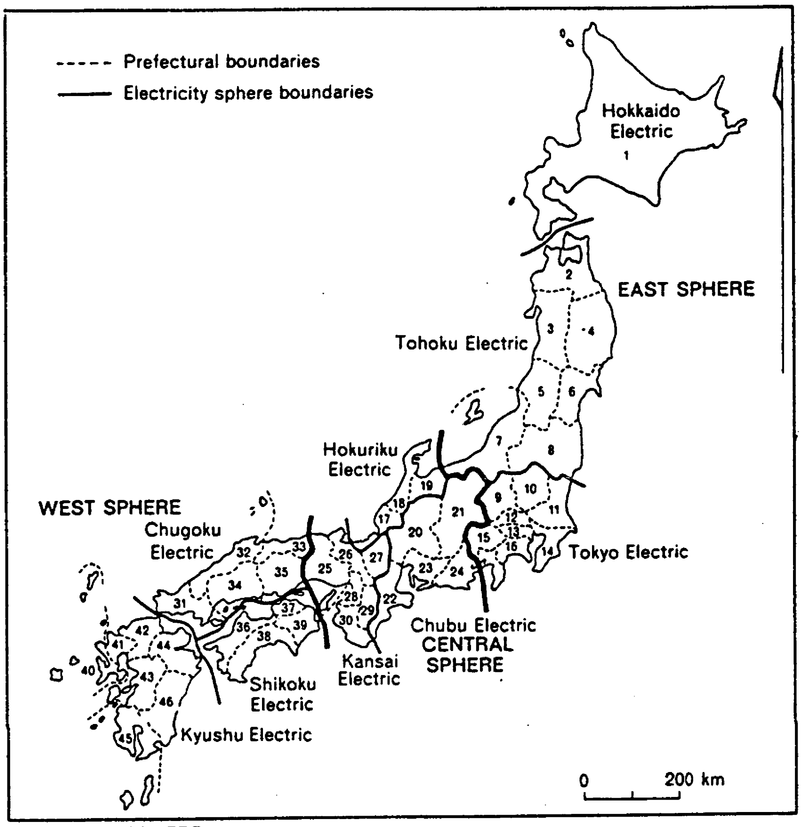
11. This argument is developed more fully in Chapter 3.

12. The Denchōshin Council, located in the Economic Planning Agency (EPA), is chaired by the Prime Minister and consists of relevant ministers, bureaucrates, businessmen and academics.

13. These spheres each consist of three electric power companies which possess monopoly rights with respect to the supply of electricity to those respective spheres.

MAP 2.2

ELECTRICITY SPHERES IN JAPAN



SPHERE		PREFECTURE	
East	Hokkaido	1. Hokkaido	
	Tohoku	2. Aomori 3. Akita 4. Iwate 5. Yamagata	6. Miyagi 7. Niigata 8. Fukushima
	Tokyo	9. Gumma 10. Tochigi 11. Ibaraki 12. Saitama	13. Tokyo 14. Chiba 15. Yamanashi 16. Kanagawa
Central	Hokuriku	17. Fukui 18. Ishikawa	19. Toyama
	Chubu	20. Gifu 21. Naganc 22. Mie	23. Aiichi 24. Shizuoka
	Kansai	25. Hyogo 26. Kyoto 27. Shiga	28. Osaka 29. Nara 30. Wakayama
West	Chugoku	31. Yamaguchi 32. Shimane 33. Tottori	34. Hiroshima 35. Okayama
	Shikoku	36. Ehime 37. Kagawa	38. Kochi 39. Tokushima
	Kyushu	40. Nagasaki 41. Saga 42. Fukuoka 43. Kumamoto	44. Oita 45. Kagoshima 46. Miyazaki

The agreement by both prefectural and relevant local governments is also a necessary requirement for Denchōshin approval.[14] This is conditioned by negotiations over property right transfer and community compensation arrangements and by the degree of broad regional acquiescence in and resistance to proposals.[15]

Denchōshin approval does not require the completion of formal transfer arrangements over the relinquishment of property rights. It only requires regional authorities to make political judgements that there are good prospects for the eventual settlement of such arrangements.[16] Furthermore, there are no explicit criteria requiring community compensation arrangements to be finalised before the issue of the permit. Acceptance by local authorities may, however, be influenced by the demands of property right owners and communities for compensation to be paid in return for their acceptance of the proposal.[17]

A salient feature of the settlement process in Japan is the existence of institutionalised arrangements which provide a

----

14. Prefectural governors, in approving proposals for submission to Denchōshin, seek the responses of local mayors and village headmen to proposed power stations.

15. In many cases, more than one local mayor or village headmen will be required to give consent to proposals for power plants. Power plants are proposed, in some circumstances, on boundaries of administrative units. In other areas, property rights owners reside in neighbouring administrative units. Under these circumstances, agreement by heads of surrounding cities, towns and villages will also be required for Denchōshin approval.

16. Information received from MITI, 1982.

17. Information received from EPA, 1982, and local government officials, 1983.

framework for bargaining between power companies and regional communities over the transfer of property rights and the payment of compensation to regional communities. The first is contained in **Dengen kaihatsu tō ni tomonau sonshitsu hoshō kijun** [Compensation Standards Accompanying Electric Power Development, hereafter referred to as Compensation Standards]. The second is contained in **Dengen sanpō** [Three Electric Power Development Laws, hereafter referred to as Three Laws]. The third are subsidies provided by the national and prefectural governments to power companies and local governments.

The Compensation Standards were established in 1963 by the Ministry of International Trade and Industry (MITI) amidst continued difficulty over the transfer of property rights necessary for the construction of hydro-electric and fossil-fuelled power plants. Table 2.2 presents a summary of the main aspects of the Compensation Standards. Their objective is to facilitate electric power development by standardising procedures and criteria for bargaining processes involved in the sale of property rights and community compensation arrangements.[18] They provide institutional mechanisms by which power companies are required to provide property right owners with monetary compensation based on certain criteria,

----

18. The Compensation Standards for electric power facilities are based on the **Kōkyō yōchi no shutoku ni tomonau sonshitsu hoshō kijun** [Compensation Standards Accompanying the Acquisition of Public Lands]. See Kobayashi T. ed., **Kōkyō yō chi no shutoku ni tomonau sonshitsu hoshō kijun yōkō no kaisetsu** [Compensation Standards Accompanying the Acquisition of Public Lands], Kindai tosho kabushiki gaisha, Tokyo, 1983 for a more detailed exposition of these Compensation Standards.

TABLE 2.2

COMPENSATION AND PROPERTY RIGHT TRANSFER PAYMENT STANDARDS RELATING TO POWER DEVELOPMENT

Objective	To facilitate electric power development by establishing guidelines for the sale of property rights and for compensation for losses incurred as a result of such development
Major Rights Involved	1. Fishing rights, including rights to stationary, sectional and cooperative fishing[a] 2. Land rights, including rights to forest and agricultural land 3. Customary rights, such as traditional rights of access 4. Rights in respect of protection of the local environment
Payment Formulae	1. Fishing $\frac{R}{r}$ where R is average net annual earnings, calculated by deducting average annual expenses from average gross annual income from the catch. Earnings are averaged on a three to five year basis excluding years in which the catch is extraordinarily large or small. Expenses include depreciation of equipment such as boats and nets, and labour and fuel costs. Income is calculated by multiplying the price of the fish by the size of the catch. r is an interest rate of 8 per cent Compensation should take into account future prospects based on existing fishing and cultivation development plans, and reduction of catch due to pollution. 2. Land (1) In cases where there have been similar transactions in nearby areas: $V \times \frac{B}{A}$ where V is the appropriately adjusted price in accordance with the time and circumstances of transactions in nearby areas B is the graded value of the land to be purchased A is the graded value of land purchased in nearby areas (2) In cases where no similar transactions have taken place in nearby areas: $\frac{R}{r}$ where R is average net annual earnings r is an interest rate of 5 per cent In cases where similar transactions have taken place in nearby areas, calculations of compensation may take the figure derived from formula (2) into account. 3. Others Based on similar cases taking into account special circumstances.
Time of Calculation	Compensation shall be based on calculations made at the time of contractual settlement. Additional payment need not be paid after settlement for any fluctuation in the value of rights.
Payment to Individuals	Payment shall be made to individuals except in cases where individual losses are difficult to estimate. In the latter case payment shall be made to the relevant organisation.
Method of Payment	Payment shall be made in the form of money. Requests for non-monetary payment such as agricultural land etc. may be accommodated as far as circumstances permit.
Scope of Application	These standards do not apply in cases where it is recognised that there is misuse of rights to obtain payment over and above what is allowed for in these standards. In cases where payment leads to social conflict, other non-monetary measures, such as the creation of employment opportunities, should be initiated.

a. Stationary fishing is the use of nets and other implements to fish in a specified area for a specified time period Sectional fishing is cultivation of pearls and seaweed in specified areas. Cooperative fishing is fishing or cultivation by a fishing cooperative or cooperatives in a specified area.

Sources: Tsūshō sangyō shō (1963), Dengen kaihatsu tō ni tomonau sonshitsu hoshō kijun saisoku, Tsūshō sangyō shō; Tsūshō sangyō shō (1963), Dengen kaihatsu tō ni tomonau sonshitsu hoshō kijun, Tsūshō sangyō shō.

and they also allow flexibility if required, in the provision of community compensation. These standardised procedures and criteria are also applicable to siting of nuclear power and associated fuel cycle facilities.

Table2.3 contains a digest of the Three Laws, which were established by MITI in 1974 against a background in the early 1970s of expected electricity supply shortages and the need to increase the availability of sites for large-scale power plants. They act as a mechanism for redistributing some of the benefits of project development, in the form of social overhead capital, from the national community to regional communities which accept projects.[19] Although power companies are taxed on the sale of electricity, the national community ultimately bears the burden in the form of higher electricity prices.

The third major type of compensation is that provided by national and prefectural governments in the form of subsidies to power companies and local governments. These subsidies, act in a way similar to the Compensation Standards and the Three Laws and provide a mechanism for redistributing some of the gains of project development from government to affected parties in order to facilitate the settlement process. They may take a variety of forms, such as the payment of funds to power companies to develop

----

19. See Tsushō sangyō shō and Shigen enerugii chō, **Dengen sanpō kankei hōrei shu,**[A Collection of Laws Governing the Application of the Three Laws], Tsūshō sangyō shō and Shigen enerugii chō, Tokyo, 1982, and Shigen enerugii chō **Dengen sanpō no gaiyō,** [An Outline of the Three Laws] Shigen enerugii chō, Tokyo, 1982.

TABLE 2.3

THREE ELECTRIC POWER DEVELOPMENT LAWS[a]

Objective	To tax power companies in order to provide subsidies to develop social overhead capital in localities that accept power plants
I Electric Power Development Tax Law	Electric power companies to be taxed at a rate of 85 yen per 1000 kilowatt hours of electricity sold
II Electric Power Development Special Accounts Law	National accounts to be structured as follows: Revenue: 1. Electric power development taxes 2. Remaining balance from previous year Expenditure: 1. Subsidies based on stipulations in the Regional Development Law (see below) 2. Special subsidies for promoting the safety of nuclear power plants and effective use of waste water
III Regional Development Law	Subsidies to localities to be made available to provide social overhead capital: roads, ports, sewerage, sports grounds and recreational facilities, educational and cultural facilities, hospitals and fire-fighting facilities etc. Subsidies to be paid where plant size exceeds the following: Nuclear and fossil-fuelled 350 000 kw Geothermal 100 000 kw Hydroelectric 1 000 kw Subsidies to be calculated on the following basis: 1. To cities, towns and villages where plants are operating or under construction:

Facility Type	Unit Subsidy (yen per kw)	x	Capacity (kw)	x	Coefficient
Nuclear	300				5
Fossil-fuelled	200-300				3
Hydroelectric					
pumped-up storage	120				5
general	120				5

2. To surrounding cities, towns and villages with boundaries that are touching the boundary of administrative units where plants are operating or under construction:

Each unit to receive an amount equivalent to the total subsidy to the administrative unit accepting the power plant divided by the number of surrounding cities, towns and villages.

No subsidies to be provided to surrounding cities, towns and villages in the case of hydroelectric stations.

Period of payment: from commencement of construction to beginning of commercial operation

a. As of 1974. Since 1974 there have been five major revisions of the law. First, the tax rate was increased from 85 to 300 yen per 1000 kilowatt hours of electricity sold. Second, subsidies for nuclear and fossil-fuelled plants were increased to 450 yen per kw, and for hydroelectric plants to 200 yen per kw. Third, the coefficients for nuclear and fossil-fuelled plants were increased to 7 and 4 respectively. Fourth, the period of payment was extended to five years after the commencement of commercial operation. Fifth. the legitimate use of subsidies was extended to cover construction of facilities for the promotion of local industry.

Sources: Compiled from Shigen enerugii chō (1982), Dengen sanpō no gaiyō, Shigen enerugii chō, and information received from MITI.

certain types of projects or payment to local governments to assist in local development policies.[20]

Licensing

The period from Denchōshin approval to the issue of the Construction Planning Permit may be regarded as the licensing stage of project development. This stage involves a regulatory process whereby national and prefectural government are required to issue permits and licenses. Regulation is in the form of the government's use of its licensing power to strike an acceptable balance between the interests of the national community in terms of the benefits of increased electricity supply and the interests of regional electorates in terms of the risks of developing that capacity.

The Construction Planning Permit is important because it signifies that agreements on property right transfer arrangements have been completed and that all relevant permits and licences have been issued.[21] Construction proper can then commence. Denchōshin approval, as noted earlier, requires only broad agreement on the transfer of property rights, but negotiations must be finalised before the issue of the Construction Planning Permit. In many cases, negotiations continue throughout the licensing stage, but they are generally concerned with finer points, such as the exact amount of compensation to be paid, or negotiations

----

20. Information received from MITI, 1982.

21. **ibid.**

with additional demands, such as compensation for the use of port facilities.[22]

There is thus considerable scope for the public acceptance process to continue into the licensing stage, and the regulatory process of licensing is likely to be influenced politically in circumstances where negotiations over property rights or community compensation arrangements are not yet finalised. For example, the Ministry of Agriculture, Fisheries and Forestry may be unable, to issue certain permits if negotiations over fishing rights are incomplete. Furthermore prefectural governments may be reluctant to grant certain licenses if political opposition still exists at the local level.

Some fifty to sixty permits and licences are usually required during the licensing stage. Some of these, such as permits relating to the use of roads and railway facilities, will be required in all circumstances, irrespective of location or type of power plant. The need for other licences depends largely on site-specific characterisitics and on the type of power plant proposed. The natural environment constitues an important site-specific factor. For example, if a power plant is proposed in or near a national park the power company will have to obtain permits under the National Park Law. Similarly, if a power company

----

22. An example of this is where power companies wish to use port facilities which fishing co-operatives utilise. The co-operatives usually demand compensation suggesting that large vessels entering ports will increase the risk of accidents and may affect fishing prospects in coastal areas where vessels pass. Information received from various electric power companies in Japan, 1983.

company wishes to locate a plant in an area endowed with prefectural forests, relevant permits must be obtained under the Forest Law.[23]

There are also other licences and permits that apply to particular types of power plants. For example, additional permits are required for nuclear power plants, the most important one being the **Genshirō setchi kyoka** [Nuclear Reactor Permit]. The major criterion for the issue of this permit is that safety investigations concerning design specification and radiation emissions be complete. MITI conducts a safety investigation and holds a public hearing to ascertain the views of local residents toward the proposal. The MITI investigation and responses by local residents are then assessed by the Atomic Energy Safety Commission, and, if necessary, design specification changes are suggested.[24]

Construction

The time from the issue of the Construction Planning Permit to the commencement of commercial operation can be regarded as the construction stage. It is mainly an economic optimisation process where construction costs are minimised

----

23. See Shakai keizai kokumin kaigi, **Enerugii kanren shisetsu no richi taisaku,** [Siting Policies for Energy Related Facilities],Shakai keizai kokumin kaigi, Tokyo, 1981, pp.1-40 for a brief discussion of the range of licenses and permits required in the siting of energy power stations in Japan.

24. Inaba Y., **Paburikku akuseputansu** [Public Acceptance], Nihon denki kyōkai shinbun bu, Tokyo, 1977, pp.192-196 and pp.203-205.

subject to resource input, such as labour and capital, and technical constraints and the need to deliver capacity to meet expected demand.

The construction stage can be sub-divided into the preliminary construction stage and the stage of construction proper. Preliminary construction involves preparing the site by the clearing, and, in some cases the reclamation of land, and the provision of port facilities. Preliminary construction can begin before the issue of the Construction Planning Permit, provided that land negotiations have been completed.[25]

Construction proper commences with the excavation of the land on which the boiler or reactor is to be placed, which can only take place after the issue of the Construction Planning Permit. As noted earlier, the Construction Planning Permit requires that all negotiations involving property rights and compensation arrangements be complete, and thus the construction stage of energy power plant development is, less subject to political influences than the earlier stages of public acceptance and licencing.

Construction involves, excavation, preparation of the foundations, construction of the reactor or boiler,[26] installation of turbines, fuel loading and trial operations.

----

25. This will, of course, also depend on the political feasibility at the regional community level of commencing preliminary construction during the licensing stage.

26. In the case of nuclear power plants, it is also necessary to construct a containment vessel which houses the reactor.

After these procedures have been completed a power company can be formally licensed to supply commercial power to the grid.[27]

The measurement of leadtime

The analysis of leadtimes for the development of energy facilties requires a measure of the average leadtimes and of the variations in those leadtimes for each stage in the implementation of projects. A major interest is the identification of the stage of project development that appears to contribute most markedly to variation in total leadtimes and, hence, presents the most difficulty to energy planners in terms of leadtime assessment.

Data sources and definitions

Data for the analysis were obtained by sending questionnaires to Japanese electric power companies. They were designed to gather information about the stages at which major decision points were reached in the siting of large-scale power plants in Japan. Appendix 1 contains an English translation of the questionnaire sent to the power industry. Questionnaires were sent to the nine electric power companies, to **Dengen kaihatsu** [The Electric Power Development Company], and to **Nihon genshiryoku hatsuden** [The Japan Atomic Power Company]. All the companies responded to the questionnaire, and approximately 90 per cent were used

----

27. Information received from the Tokyo Electric Power Company and the Institute of Energy Economics, 1983.

in the analysis. The remaining responses could not be used because the questionnaire had not been properly completed or because company records did not supply sufficient data. The SPSS statistical package was used in the processing of the statistics.[28]

The beginning of the siting process, for the purpose of providing a measure of leadtime, is taken to be the point when a power company makes a formal decision to locate facilities at a particular location.[29] As noted earlier, there are a number of decisions which can be made in the context of deciding upon a site.[30] An examination of the data obtained from the questionnaire suggests that there were no substantial differences between the times taken to make any combination of those decisions.[31] The earliest

----

28. Nil N.H. et al., **Statistical Package for the Social Sciences**, second edition, McGraw Hill Inc., New York, 1970.

29. Extensive interviews with personnel from several electric power companies revealed that it would be extremely difficult for power companies to provide information on when particular locations were initially included in candidate site pools. Candidate sites can stay in pools for many years waiting to be selected and, therefore, are not relevant to an analysis of the leadtimes necessary for the implementation of power stations.

30. See Table 2.1.

31. An examination of the data reveals that any difference appears to be in the range of between zero to four months. These discrepancies are likely to influence measurements plants with relatively short leadtimes. They will not affect significantly measurements where leadtimes are exceptionally long. These differences reflect the difficulty of identifying an unequivocal starting point from which to measure leadtime. While they prevent precise measurements, they are not likely to alter the overall pattern that emerges from the analysis.

time that was registered in the questionnaire was taken for each case.

Denchōshin approval, as noted earlier, does not necessarily imply that all relevant bargaining processes are complete. These processes may continue into and influence licensing processes. Therefore, in addition to considering public acceptance times and licensing times seperately, it is also necessary to consider pre-construction leadtimes, defined as public acceptance plus licensing leadtimes, to provide a measure of the times necessary to reach settlements over the construction of power plants.

The study covers the period from 1960-1979 and includes facilities still in the planning stage or under construction in 1979. Facilities which had not obtained Denchōshin approval by 1979 are given arbitrary public acceptance times (taking 1979 as the cut-off point) and average licensing and construction times.[32] Power stations that had received Denchōshin approval by 1979 but had not commenced commercial operation at the time of the questionnaire are similarly given arbitrary average licensing or construction times or both.

The analysis divides energy power plants into the two categories of nuclear and fossil-fuelled power plants. In

----

32. For example, after taking five years to obtain public acceptance, a particular fossil-fuelled project may, have been given Denchōshin approval in October 1979. If the average licensing and construction times for all fossil-fuelled plants were one and three years respectively, that particular fossil-fuelled project would be assigned an arbitrary total leadtime of nine years.

the category of nuclear power plants are light water and heavy water reactors and gas-cooled reactors. Oil, coal and liquefied natural gas plants and plants using a combination of these and other fuels (such as naptha) are grouped together in the category of fossil-fuelled plants. Insufficient data prevent a more refined classification of fuel categories.

Power facilities are not considered as individual units but as packages, a package consisting of one or more power plants. Electric power companies in Japan, in the majority of cases, reach agreement with regional communities to locate and construct several power plants, rather than proceeding on a sequential, plant-by-plant basis. In contrast, licensing and construction are usually undertaken on a plant-by-plant basis. The times used in the analysis for licensing and construction stages are average times for the given package.[33]

Power companies usually site more than one package at any one location. When plants are sited at a location where

----

33. There are two alternative ways of measuring public acceptance times given the nature of power companies' siting policies. One is to give all plants in the package equal public acceptance times; the other is to give the first plant its true public acceptance time and to assign a zero public acceptance time to other plants in the package. The choice of approach substantially affects average leadtimes and variation in those times. In contrast, taking average times for licensing and construction stages for plants in the package does not lead to large differences in results compared with the unit plant approach to the measurement of those times, and at the same prevents distortions in the measurement of public acceptance times.

there are no existing plants in the planning stage, under construction or operating the package is defined as the first or initial package; when plants are located at a site where there are existing plants in the licensing stage, under construction or operating, the package is defined as a subsequent package.

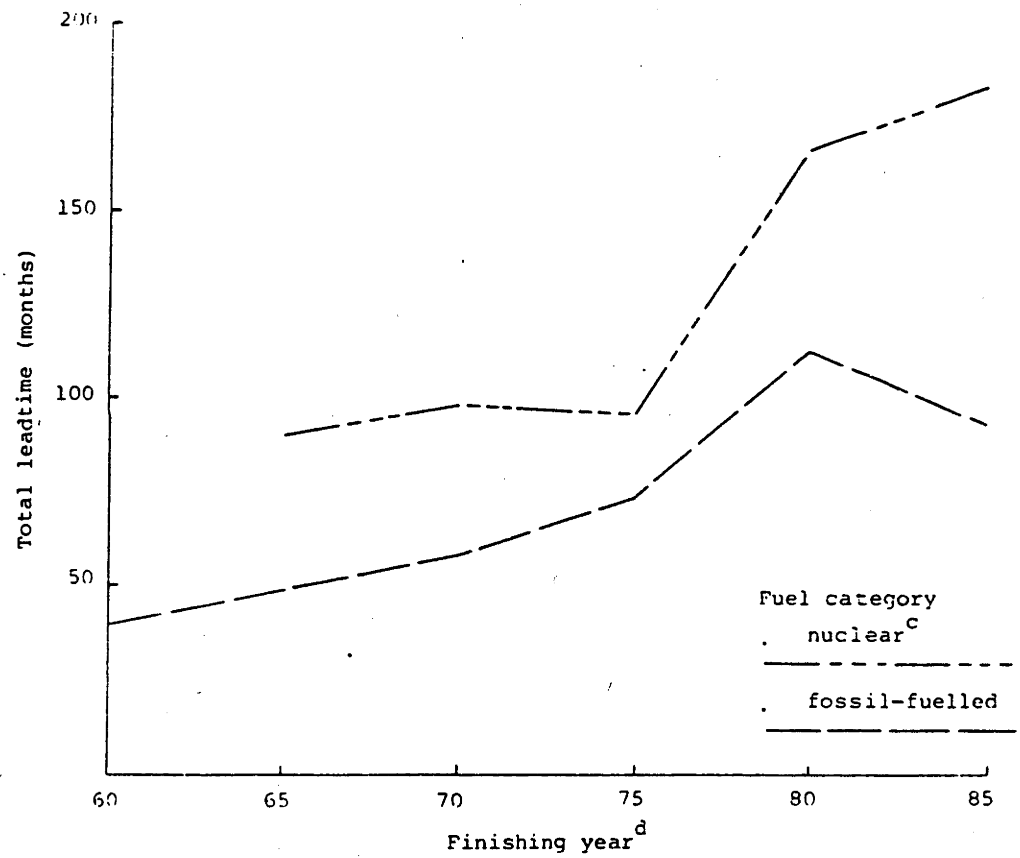
Patterns of leadtime behaviour

Figure2.1 depicts trends in average leadtimes for both nuclear and fossil-fuelled power plants, both of which increased over the period. Average nuclear leadtimes were relatively constant during the period from 1965 to 1975, but started to show comparatively large increases after 1975, lengthening from 90 months in 1975 to approximately 160 months by 1980. In contrast, fossil-fuelled plant leadtimes increased steadily from approximately 40 months in 1960 to 90 months by 1980. Trends in leadtime lengths after 1980 are also presented. Nuclear leadtimes continued to show an increase after 1980, but the increase in fossil-fuelled power plant leadtime appears to have tapered off and there is even a slight decline. This suggests that while there appears to be a continued trend toward increasing nuclear plant leadtimes, the trend toward longer leadtimes for fossil-fuelled plants seems to have been checked.

The statistical analysis involves the construction of three measures. The first is a measure of mean leadtime for each stage of the siting process. The second is a measure of the

FIGURE 2.1

ENERGY POWER PLANT LEADTIMES[a,b]



a. including estimates
b. five year averages
c. nuclear power plants did not start commercial operation in Japan until 1965
d. indicates year when construction finished or is expected to finish

co-efficient of variation, which indicates the relative degree of dispersion around those averages.[34] These two measures are then used to assess the relative contribution of each stage to variation in total leadtime.[35]

A two-way analysis of variance is used to test for the statistical significance of differences in average leadtimes between fuel categories (nuclear and fossil-fuelled plants) and within each of those categories (initial and subsequent packages) for each stage of the siting process. Interaction effects, which test whether the proportional differences in leadtimes for nuclear and fossil-fuelled plants are the same for initial and subsequent packages and vice-versa, are also considered.[36]

Table 2.4 illustrates average total nuclear and fossil-fuelled plant leadtimes and variation in those leadtimes calculated in this analysis, and compares them with two other published results on power plant leadtimes in Japan. The results of the present study appear to be in general agreement with the estimates by Lester and the Japan Statistical Centre (JSC). Both Lester and JSC, however, are

----

34. See Kane E.J., **Economic Statistics and Econometrics: An Introduction to Quantitative Economics**, A Harper International Edition, New York, 1969, p.78.

35. For example, two stages may have a similar degree of variation, but the first stage may be significantly longer than the second stage. It is possible to suggest that the first stage is a more important influence on total leadtime variation. The second stage, while having a large variation, is shorter and, therefore, has a less significant impact.

36. Wonnacott R.J. and Wonnacott T.H., **Econometrics**, second edition, John Wiley and Sons, New York, 1979, pp.101-115.

TABLE 2.4

ESTIMATES OF POWER PLANT LEADTIMES IN JAPAN

		Plant Category	
Study	Estimates	Nuclear	Fossil-fuelled
Lester[a]	mean[b]	108-144	-
	cov[c]	-	-
	nobs[d]	-	-
JSC[e]	mean	143.8	76.6
	cov	0.47	0.35
	nobs	(24)	(19)
Present study	mean	153.4	75.4
	cov	0.35	0.50
	nobs	(35)	(55)

a. Lester, R.K., op. cit ., p. 134.
b. Measured in months
c. Co-efficient of variation
d. Number of observations
e. Nihon tōkei sentaa, op. cit., p. 7.

only concerned with total leadtimes; they overlook important behavioural variations in leadtimes for each stage of the siting process.

Table2.5 presents the major patterns of variation in leadtimes that emerged from the analysis. The average total leadtime for nuclear power plants (153.4 months) appears to be roughly twice as long as leadtime for fossil-fuelled plants (75.4 months), and the same pattern is observable for all stages of the siting process.

Furthermore, the F-test provides evidence that these differences in leadtimes for all stages of the siting process are statistically significant. An important characteristic of leadtimes is relatively short licensing leadtimes: licensing leadtimes for both nuclear (21.7 months) and fossil-fuelled plants (11.7 months) appear to contribute relatively little to total leadtimes. This contrasts markedly with average public acceptance and construction times, which appear to be major components of total leadtimes.

Leadtimes to locate initial nuclear and fossil-fuelled packages (165.5 months and 86.1 months, respectively) seem to be longer than leadtimes for subsequent nuclear and fossil-fuelled packages (112.5 months and 51.4 months). The F-test indicates that the shorter leadtimes for subsequent packages relative to initial packages are statistically significant. The relative ease in locating subsequent packages is attributable to shorter public acceptance times for subsequent packages, whether nuclear or fossil-fuelled

TABLE 2.5

ENERGY POWER PLANT LEADTIME VARIATION[a]

Category	Nobs[b]	Statistic	Total leadtime[c]	Public acceptance leadtime (1)	Licensing leadtime (2)	Pre-construction leadtime (1) + (2)	Construction leadtime
Nuclear	(35)	Mean	153.40	69.60	21.70	91.30	62.00
		COV[d]	0.35	0.74	0.49	0.59	0.16
Fossil-fuelled	(55)	Mean	75.40	31.50	11.70	43.20	32.10
		COV	0.50	1.08	1.11	0.84	0.29
Initial nuclear	(27)	Mean	165.50	82.00	20.80	102.80	62.70
		COV	0.33	0.62	0.51	0.53	0.17
Subsequent nuclear	(8)	Mean	112.50	27.80	24.70	52.60	59.80
		COV	0.24	0.81	0.44	0.57	0.13
Initial fossil-fuelled	(33)	Mean	86.10	38.30	14.90	53.30	32.80
		COV	0.50	1.03	1.06	0.77	0.28
Subsequent fossil-fuelled	(22)	Mean	59.40	21.20	6.90	28.10	31.20
		COV	0.35	0.99	0.62	0.74	0.31
Fuel		F-ratio	63.996*	14.346*	21.233*	22.975*	160.902*
Package		F-ratio	13.193*	12.535*	3.216	15.624*	0.957
Two-way interactions		F-ratio	0.053	3.624	4.595	0.226	0.032

a. includes estimates for plants in the planning stage or under construction as of 1979.
b. number of observations
c. in months
d. co-efficient of variation
e. significance levels are calculated at two degrees of freedom.
* significant at 99.5

Source: Original data from survey.

(27.8 months and 21.2 months), compared with initial nuclear and fossil-fuelled packages (82.0 months and 38.3 months). In contrast, licensing and construction times for both fuel categories do not appear to vary significantly between initial and subsequent packages.

Major patterns that emerge are that nuclear plant leadtimes are longer than fossil-fuelled plant leadtimes and that initial package leadtimes are longer than subsequent package leadtimes. In proportional terms, the leadtime differences between fuel categories are also similar for package categories irrespective of the type of fuel used. This suggests that, in general, the proportional differences are relatively stable irrespective of fuel or package category.[37]

There is a high degree of dispersion around average total leadtimes for both nuclear and fossil-fuelled facilities in the siting of both initial and subsequent packages. These measures can be used to gauge the variation in times for various component stages of project development and to identify the stage of project development which contributes most significantly to variation in total leadtimes.

---

37. The F-ratios for public acceptance and licensing times are 3.624 and 4.595 and appear to be relatively high. This suggests that subsequent nuclear public acceptances are proportionally shorter than fossil-fuelled public acceptance times when compared with initial packages. On the other hand, licensing times are shorter for subsequent fossil-fuelled packages when compared with initial packages. These proportional differences are not, however, statistically significant. The F-ratio decreases to 0.226 when pre-construction times are grouped together.

Pre-construction times appear to be considerably more variable than total leadtimes. This contrasts markedly with construction times, which seem relatively stable compared with total leadtimes. Given that both pre-construction and construction stages, have, in general, similar average leadtimes, the results strongly suggest that variation in the pre-construction times accounts for variation in total leadtimes. There is some variation in construction times, but this does not appear to have an important influence on the variation in total leadtimes.

A breakdown of the pre-construction stage into a public acceptance component and a licensing component reveals substantial variation in both stages. The co-efficient of variation appears to be relatively high and roughly the same for both public acceptance and licensing stages irrespective of the plant category considered. However, since licensing times are generally shorter than public acceptance times, they make a less significant contribution to the variation in total leadtimes.

Sources of unpredictability

Japanese energy planners, after selecting minimum cost sites on which to schedule energy project developments to balance electricity supply and demand, face a high degree of unpredictability in times necessary to site and construct energy power facilities. The unpredictability stems mainly from the variation in times at the front end of the siting process, where social and political settlements are reached. The back end of the process which involves licensing and construction, does not appear to have a marked influence on the variation in total leadtimes.

Confidence in the prediction of leadtime appears to increase substantially after public acceptance has been negotiated. This is because public acceptance is the outcome of a highly volatile process of bargaining between and among the promoters and regional communities over an equitable distribution of costs and benefits expected to accrue from project developments; thus the bargaining process itself and the variability in its outcomes, are the major factors in the unpredictability of the leadtimes for implementing power projects.

The bargaining process continues during the regulatory stage, but is mainly concerned with finer points such as the completion of negotiations with property right owners and the issue of various licences and permits. The settling of these finer points only accounts for a small part of the siting process, and therefore is unlikely to be as critical in the determination of leadtime variations as the times necessary to reach broad agreements over the development of power stations.

In the final stage of project development, power companies try to minimise the cost of constructing power plants. The construction stage is commenced only after all regional bargaining has been completed, and is less subject to political processes than the public acceptance and licensing stages. Construction times are relatively stable and therefore are not likely to exert a significant influence on the variation in total leadtimes.

The variability in public acceptance times implies that compensation mechanisms are not operating in the same way in all circumstances. Institutionalised compensation arrangements, which are designed to redistribute some of the benefits of project development to regional communities and facilitate the settlement process, do not appear to guarantee predictability in times necessary to win approval for the construction of power projects. Chapter 3 develops an extended cost-benefit framework which will be of use in the assessment of settlement times. It stresses the importance of distributional effects and, hence, the need to examine the effectiveness of compensation mechanisms in analysing why approval for some projects takes longer than approval for others.

THE POLITICAL ECONOMY OF DELAY

Standard Cost-Benefit Analysis (CBA) ranks the development of projects in terms of economic efficiency criteria. This approach is useful for identifying high return projects, independently of the management of compensation requirements and other 'non-economic' factors. It can, however, be extended analytically, focussing on the importance of distributional effects and the effectiveness of compensation mechanisms, to provide a more comprehensive framework which will allow for the assessment of the times necessary to reach social and political settlements over the development of projects.

The need for a settlement process arises out of a divergence between the value of a project to promoters and regional communities. The process is characterised by bargaining over a politically acceptable allocation of costs and benefits expected from the project; it takes time and it, therefore, influences the order in which projects are delivered. Settlements will require that promoters compensate regional communities for losses expected to be incurred as a result of project development. Where compensation mechanisms do not operate effectively or cannot be developed easily, delay may be expected in project implementation.

Settlement times will be determined jointly by the willingness of promoters and regional communities to develop and accept projects. The extent of the divergence in the value of projects will be influenced by distributionally weighted benefits and costs. The distributional effects of projects will influence the value that is placed upon the costs and benefits of project development. These effects will, therefore, be important in determining the extent to which benefits exceed costs, or the economic surplus which is available for redistribution from project promoters to affected interests. Project implementation is likely to be delayed in situations where there is little surplus available for redistribution to regional communities and where compensation mechanisms are not and cannot be effectively tuned to take into account distributional effects consequent upon a particular project development.

A model is developed for the purpose of providing some quantification of the importance of distributional effects on the variation in the times taken to reach settlement in the implementation of projects. The value that regional communities place on accepting projects will depend on factors such as: the expected environmental costs of projects, the size of the rural sector, the ideological orientation of the community, the risks of different types of projects and prevailing social attitudes. The willingness of developers to implement projects will depend on, amongst other things, the need to meet expected demand for project output. These influences can be measured and can be regressed on a public aceptance leadtime variable in order to consider their relative importance in explaining the variation in settlement times.

The model provides a reference point and allows for the analysis of other factors, such as the allocation and use of political power, the skill with which bargaining strategies are employed, uncertainty about outcomes and changing expectations, which are also likely to influence settlement times. These influences may act to impede or facilitate bargaining in a way which may not be captured fully in quantitative analysis of distributional influences, yet need to be considered in developing a comprehensive model which will be of use in the evaluation of settlement times.

CBA and project delay

Assume private promoters know exactly the rate at which demand for output of a particular type of project will increase. Suppose that financial appraisals[1] suggest that only one additional unit is required to meet the expected increase in demand. If promoters are acting in a world where there are no distributional effects or compensation is delivered appropriately without the need for bargaining, and political settlements are not necessary, then there will be some economically optimal rate at which they would invest resources to construct the project in the planned time.

This optimal timing will be determined by a trade-off between the marginal costs of investing resources too slowly

----

1. See, for example, Turvey R., 'On Investment Choices in Electricity Generation', **Oxford Economic Papers**, November 1963, and Anderson D., 'Models for Determining Least Cost Investments in Electrical Supply', **Bell Journal of Economics and Management Sciences**, No.3, 1972, for analyses of the various factors influencing investment decisions in the electric power business.

and investing resources too quickly. The expenditure of resources too quickly would require paying higher prices for inputs into the construction process[2] and would temporarily result in idle capital from which no return could be derived. Utilising labour and capital too slowly would lead to higher interest rate charges[3] and forgone benefits of not being able to supply output to a future market on time. In the model developed here, all projects are presumed to have similar optimal construction times.[4]

After determination of the rate at which resources will need to be invested, a promoter would choose a site on which to construct that project.[5] In principle, candidate sites might be located near consumption areas or placed on offshore islands. Promoters wishing to minimise cost would prefer to locate projects as close as possible to consumption areas. Placement in other areas, such as on offshore islands, may be technologically possible but it may necessitate the construction of relatively expensive

----

2. In principle, it would be possible to construct a power project in a very short period of time, say, a few weeks. This would, however, require huge amounts of labour and capital resources being employed very quickly. It would, other things being equal, increase substantially the prices of those resource inputs.

3. Because of the huge capital costs involved, power companies usually borrow finance to construct energy facilities. Interest repayment charges would increase if projects were overly delayed.

4. See Chapter 2 for data on average construction times and variation in those times.

5. Refer to Chapter 2 for an analysis of site selection criteria in the development of energy power plants.

distributional systems for project output, and may involve higher cost in transporting components needed for the construction of projects.

Promoters would rank candidate sites in terms of cost minimisation, at least from their perspective. It would be possible to line up all projects in terms of efficiency measured in this way, and to calculate, through assessing costs and benefits, the array of project ordering. Assuming that construction times are relatively constant, it would be expected, other things being equal, that the project at the first selected site would start operation before the second and so on. Given these assumptions, the schedule of project commencement would be closely associated with the schedule of project completion. Such circumstances are, however, hypothetical, since social and political factors not included in promoter cost-benefit calculations, will influence the schedule of project completions. These hypothetical circumstances can, therefore, be used as a yardstick against which to consider the social and political factors influencing the variation in settlement times.

The development of a project brings social and economic benefits and costs to a host of community interests or actors. These actors include communities at different constituency levels, such as national and regional communities, in addition to private companies. To the national community, there may be benefits, such as improved energy self-sufficiency, which may reduce the cost from disruption of strategic imports. There may also be costs to the national community, such as the use of public resources that could be used for the attainment of alternative national policy objectives. Regional communities may have separate interests. To regional communities, there may be merits, such as the expansion of development opportunities. At the same time, there may also be an increased potential of exposure to hazardous environmental pollutants.

As outlined in Chapter 1, standard CBA[6] asks whether or not projects should go ahead based on economic efficiency criteria. It specifies and aggregates all relevant benefits and costs. These costs and benefits are treated and measured in the same way no matter to whom and under what circumstances they accrue. It suggests that a project go ahead on efficiency grounds providing a potential Pareto improvement (PPI) exists. In this context, a PPI exists if aggregate benefits exceed costs, or there is an expected economic surplus, and individuals disadvantaged by the project could, in principle, be compensated by those who

----

6. There is a substantial body of literature on Cost-Benefit Analysis. See, for example, Dasgupta A. and Pearce D.W., **Cost-Benefit Analysis**, MacMillan, London, 1978, Little I.M.D. and Mirrless J.A., **Project Appraisal and Planning for Developing Countries**, Basic Books, New York 1974, Layard R., **Cost-Benefit Analysis: Selected Readings**, Penguin Education, Sugden R. and Williams A., **The Principles of Practical Cost-Benefit Analysis**, Oxford University Press, London, 1978, Pearce D.W., **Cost-Benefit Analysis**, MacMillian, 1971 and Mishan E.J., **Cost-Benefit Analayis: An Informal Introduction** Allen and Unwin, 1972. For a survey of the Cost-Benefit literature, see Prest T. and Turvey R., 'Cost-Benefit Analysis: A Survey', **Quarterly Journal of Economics**, December 1965, reprinted in **Surveys of Economic Theory**, Vol.3, MacMillian, 1966.

were advantaged by it and still remain at least as well off as before the change.

Compensation is, however, paid by project promoters to regional community interests in order to conclude a settlement over the construction of projects. This payment may be in monetary form or in non-monetary form, such as in the provision of employment opportunities or public goods. Whatever the form, compensation is paid through a variety of political and institutional mechanisms. Private promoters may pay compensation directly, through established mechanisms or, secretly, in under the table deals. Alternatively, compensation may be paid indirectly to regional communities. For example, the public at the national level may be taxed on the consumption of project output and that revenue may be redistributed, in the form of a subsidy to regional communities.

Even if benefits exceed costs in aggregate or there is an economic surplus, there may well be a disparity between the value of a project to promoters as measured alongside the value of a project to regional communities.[7] In reality, the divergence in the value of projects, as perceived by different interests in the community, will infuence the speed and success with which projects are implemented. If

----

7. See Pearce D.W., and Sturmey S.G., 'Private and Social Costs and Benefits: A Note on Terminology', **Economic Journal**, Vol.76, March 1966, Turvey R., On Divergences between Social Costs and Private Costs, **Economica**, Vol.30, August 1963, and Coase R.H., 'The Problem of Social Cost', **The Journal of Law and Economics**, Vol.3, October 1960.

communities have veto power over placement decisions then the settlement process must involve bargaining over a politically acceptable distribution of costs and benefits expected from the project.

Figure 3.1 illustrates, schematically, the multiplicity of interests at various constituency levels that can become involved, directly or indirectly, in bargaining over the development of energy projects. Figure 3.1a contains the major actors involved in macro-bargaining. Agreement from actors at different constituency levels, such as power companies, national prefectural and sub-prefectural electorates and other interests, such as ideologically motivated anti-nuclear movements, will be required in the course of settlement. Bargaining will also occur on a sub-prefectural or on a micro-level and the actors involved in this level of bargaining are shown in Figure 3.1b. Within the local electorate that is asked to accept the project, the consent of interests, such as property right owners, the local assembly and the public, is necessary to win approval to develop an energy project. As the social and physical environmental impacts of projects may not be confined to the local electorate accepting the project, surrounding electorates may also become involved in agreement processes.

Figure 3.1 also illustrates the complexity of the relationships among and between actors involved in bargaining. In the course of settlement, various interests will use economic markets, such as electricity and property right markets, as well as political institutions and power

FIGURE 3.1

THE STRUCTURE OF BARGAINING OVER PROJECT DEVELOPMENT

Figure 1a: Macro-bargaining

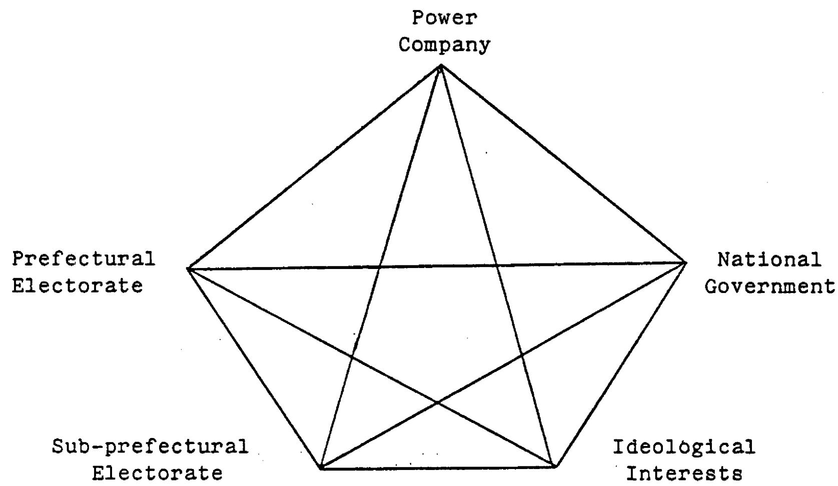
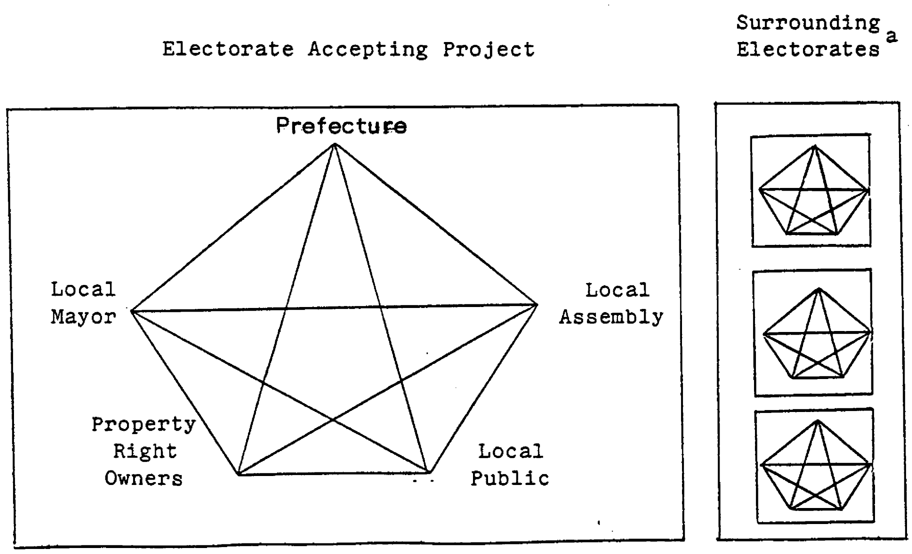


Figure 1b: Micro-bargaining (Regional Level)



Notes: a. The interests in the surrounding electorates are the same as the interests in the electorate accepting the project.

and influence, to increase their share of the surplus expected to be generated as a result of a project development. A settlement will require social and political agreement over the distribution of costs and benefits expected to accrue from the implementation of a project. For example, a settlement will necessitate an agreement between a power company and property right owners over the relinquishment of property rights. In the course of that settlement, the prefectural and the local mayor may also attempt to persuade property right owners to accept the project.

Project promoters will be required to compensate regional communities for losses expected to be incurred in order to effect a settlement. Where compensation mechanisms do not operate effectively or cannot be developed easily, delay may be expected in project agreement. The effectiveness of compensation mechanisms is likely to be related to the pattern of expected distributional impacts, uncertainty about outcomes, the allocation and use of political bargaining power, strategies employed by actors, and changing expectations of parties in the course of settlement.

The extent of the divergence between the value of a project to promoters and regional communities may not necessarily be reflected fully in simple benefits and costs. Simple costs and benefits as used in standard CBA, may not reflect the true valuation that is placed on those costs and benefits. Distributional effects may not be neutral; promoter and regional community interests may under different circumstances and for a variety of reasons evaluate differently costs and benefits.[8] As noted in Chapter 1, the distributional effects of projects will depend on factors such as: expectations about social and economic opportunities and will influence the value that is placed upon the costs and benefits of project development. The value that interests participant to the settlement place upon project development will shape their responses to reaching a settlement. For example, there will be resistance to projects if distributional impacts are not neutral and compensation mechanisms are not capable of taking adequately into account unfavourable effects expected from project development.

Even if compensation mechanisms are able to cope adequately with distributional effects on actors, the degree of resistance to and support for projects may also depend on the spread of costs and benefits among either different

----

8. For analyses of distributional issues as they relate to the measurement of costs and benefits, see Hettich W., 'Distribution in Cost-Benefit Analysis: A Review of Theoretical Issues', **Public Finance Quarterly**, Vol.4, December 1969, Weisbrod B.A., 'Income Redistribution Effects and Benefit-Cost Analysis' in Chase S.B., ed., **Problems in Public Expenditure Analysis**, The Brookings Institution, Washington D.C., 1968, Musgrave R.A., 'Cost-Benefit Analysis and the Theory of Public Finance', **Journal of Economic Literature**, Vol.7, September 1969, Skolnik M.L., 'A Comment on Professor Musgraves Separation of Distribution from Allocation', **Journal of Economic Literature**, Vol.8, June 1970, MacGuire C.B. and Garn H.A., 'The Integration of Equity and Efficiency Criteria in Public Project Selection', **Economic Journal**, Vol.43, 1975, and Nash C., Pearce D., and Stanley J., 'An Evaluation of Cost-Benefit Analysis Criteria', **Scottish Journal of Political Economy**, Vol.22, 1975.

promoters or interests within regional electorates. Settlements are likely to be highly contentious if, for instance, certain community groups are expected to make large gains at the expense of large losses by others. Under these conditions, it may be more difficult for promoters to effect the necessary compensation payment and this may influence the speed of settlement.

The costs and benefits expected to accrue from a particular project development may not be known with certainty. There may be uncertainty as to the value of projects. Compensation mechanisms may not work effectively if participants to the settlement place different weights on uncertainty and have different attitudes towards risk. Certain community interests, because of a lack of or incorrect information, may be concerned about the value of a particular project development and this may prevent a quick settlement over the construction of a project.

The degree of difficulty in reaching settlements may not be reflected simply in the distribution of benefits and costs, even if they are evaluated accurately. Distributional effects on promoter or community interests may not be closely related to the political capacity of those interests to influence settlements. Certain community actors, such as those who possess legally recognised property rights, are likely to possess disproportionate political power, and may use this power to impede or facilitate the use of compensation mechanisms and settlement in project implementation.

The skill with which various community interests employ bargaining strategies will affect the settlement process. Bargaining strategies will include economic, political, technical and informational strategies or some combination of them. Whatever the strategy employed, it will be designed to alter the distributional effects of projects or the political capacity of interests participant to the settlement. For instance, a technical strategy, such as project design modification, may reduce the costs that particular regional interests expect to incur or the need to negotiate with those interests and, thus, facilitate a settlement.

The revision of expectations about the value of projects will also affect settlement outcomes. During the settlement process, changes may occur and lead to a divergence between what was expected to occur and what actually occurs. Preferences may not be stable and changes in economic, political or policy related factors may introduce instabilities into bargaining. These changes may alter benefit-cost ratios and bargaining positions of interests participant to the settlement and may, therefore, affect approval times.

The distribution of costs and benefits

The distribution of costs and benefits, and the way in which compensation can be affected among various interests in the community, will be an important factor influencing settlement times. Resistance to projects is likely to be stronger in situations where distributional effects are not neutral and there is expected to be little economic surplus to be redistributed in order to reach a settlement between promoters and regional communities. The effective operation of compensation mechanisms requires that distributional effects are taken fully into account.

It is possible to develop a model which will allow for the assessment of the settlement times by considering the importance of distributional effects on the variation in times that are required to win approval over the installation of electricity projects. The model can be set up to consider regional community and project promoter responses to the development of energy stations and the impact of those responses on the relative ease or difficulty in reaching agreement over project developments.

Regional community and promoter responses

The time required to reach a settlement over the development of projects will be determined jointly by the willingness of regional communities to accept those projects and the willingness of promoters to develop those projects. The response of regional electorates to offering sites on which projects can be developed will be a function of, amongst other things, the expected environmental costs of projects, the size of the rural sector, the risk involved in accepting projects, the structure of political party representation and prevailing social attitudes toward preservation of the environment. The willingness of promoters to develop projects will be determined by factors such as the need to develop additional capacity to meet expected electricity shortfalls.

The degree of difficulty in reaching a settlement can be associated with the extent to which regional communities at various constituency levels expect to incur net social benefits from the development of projects. The construction of projects might be expected to bring benefits, such as expanded developmental opportunities to regional electorates. It might also be presumed to affect environmental quality adversely. An important factor influencing the time to reach settlements is likely to be an assessment, in a broad sense, of the expected environmental costs involved in the construction and operation of projects compared with the costs of other forms of social and economic development.

Even if all benefits and costs of projects are similar in an objective and technical sense, they may be evaluated differently in terms of their distributional effects. For instance, particular regional communities may weigh highly the adverse environmental effects expected to accrue from a project; others may not be so concerned about those environmental costs. The importance that regional communities attach to the expected environmental costs of projects will be a function of the extent of social and economic opportunities and expectations about those opportunities and is likely to influence settlement outcomes.

Suppose environmental quality is a normal good in the economic sense that more of that good is demanded as social and economic opportunities expand.[9] Assume that expectations are only a function of prevailing levels of those opportunities when communities are approached and asked to accept projects. Under these conditions, it might be expected, other things being equal, that economic projects would be more readily accepted in areas where social and economic opportunities are relatively low. On the benefit side, those areas are likely to attach more weight to the marginal increase in opportunities arising out of project development. On the cost side, they are likely to attach less weight to the incremental impairment of environmental quality. A community attaching less weight to costs and more weight to benefits is likely to offer less resistance in supplying a location for a project.

Expectations are likely to be shaped by past experience of social and economic opportunities in addition to the prevailing levels of those opportunities. Expectations about future opportunities may also change cost-benefit calculations by regional communities and, consequently, may influence agreement times. Assume there are two areas with the same relatively low levels of opportunities at the time

----

9. Baumol W.J. and Oates W.R., **The Theory of Environmental Policy, Public Outlays and Environmental Policy,** Prentice-Hall Inc., New Jersey, 1975, especially Chapter 13, and Freeman A.M., 'The Distribution of Environmental Quality' in Kneese A. and Bower B. eds., **Environmental Quality Analysis: Theory and Method in the Social Sciences,** John Hopkins Press, Baltimore, 1972.

when they are asked to accept a project. Suppose that in one area there had been a relatively large increase in those opportunities over a certain period before the approach, while in another area there had been a relatively low increase. Based on the proposition above, it would be expected that a settlement would be more difficult in an area where social and economic opportunities had been expanding relatively quickly. The community would likely place less weight on the expansion of social and economic opportunities as it would be expected that those opportunities could be expanded without the need for projects. They would also place more weight on the expected environmental degradation associated with project development.

An alternative hypothesis might suggest that settlements may be easier in areas where social and economic opportunities are expected to rise rapidly. Those areas are likely to be undergoing relatively rapid economic growth. They may even be experiencing a boom in economic activity. Having experienced the benefits of growth, these communities may wish to see a continuation of rapid economic development. Given the prominence of the benefits associated with growth, there may be a lag in anticipating any adverse environmental effects from project development. Consequently, there may be less resistance to project development.

Regional communities may not be homogeneous and distributional impacts may vary from one region to another. Projects may be less readily accepted in areas where, for example, the rural sector is relatively large because primary producers may attach high weights to the costs of projects which are perceived to have disruptive effects on factors of production, such as land and water. Primary producers may be hesitant to part with their land and, therefore, may attach less weight to the expansion of non-rural employment opportunities generated by project development.

Projects may not be similar and settlement times may vary because of differences in anticipated environmental risk associated with the development of projects. The nature of and familiarity with different types of risk may influence the community response to accepting a particular type of project.[10] Higher expected risk, given equivalent benefits may increase the cost of projects to affected communities and lead to relatively more community resistance.

The nature of the risk involved in different types of projects, such as nuclear and non-nuclear, may influence the willingness of a regional community to deliver a site on which to build that project. Because of historical experience, such as the wartime experience in the use of nuclear technology, communities may attach relative importance to the risk of nuclear projects compared with

----

10. See Starr C., 'Social Benefit Versus Technological Risk', **Science**, Vol.165, September 1969, Meleis M. and Erdman R.C., 'The Development of Reactor Siting Based on Risk Probability', **Nuclear Safety**, Vol.13, 1972, Salem S.C., et al., **Issues and Problems in Inferring a Level of Acceptable Risk**, R-2561-DOE, Rand, Santa Monica, August 1980 and Lowrance W., **Of Acceptable Risk: Science and the Determination of Safety**, William Kaufmann Inc., Los Altos, 1970.

that of fossil-fuelled projects. Even if the benefits of both types of plants are similiar, there may be more resistance to concluding a settlement with promoters over the installation of a nuclear projects.

The perception of risk may vary in a way which is related to the familiarity with projects. There is usually more than one energy station located at any given site. Initial concerns about risk may be high. Perceived risk may fall after local communities have become accustomed to the environmental risks and the economic benefits associated with the construction and operation of projects. As a result, there may be less resistance in accepting additional projects in localities which have at least one project.

The structure of political party representation in regional assemblies may act to impede or facilitate settlement processes. Political party ideology affects attitudes towards such things as: interest in economic development, type of fuel used, and the desired structure of economic and social activity. Leftist political parties may oppose projects, on ideological grounds, even if there are expected to be economic benefits associated with such projects. In some situations, leftist groups may be more capable of sensitising risk and environmental issues. Consequently, regional electorates may be presuaded that the costs of projects is high and there may be more resistance to project development. It might be expected, other things being equal, that settlements would take longer in areas where leftist political parties have relatively strong representation in regional assemblies.

Prevailing social attitudes toward the preservation of the environment and changes in those attitudes may also influence settlement outcomes. Approval times are likely to be relatively short in periods where there is strong emphasis placed upon high economic growth objectives. The emergence of pollution problems associated with industrial development generally may change community attitudes so that more stress is placed on potential environmental impacts of energy facilities. Consequently, approval times would be expected to increase.

The time necessary to reach settlements will also be influenced by the importance that promoters, such as power companies and national governments, place on the development of projects in servicing markets for their output. Promoters, all other things being equal, are likely to have a stronger incentive to develop projects in situations where shortages of output from projects are expected to be relatively high. Under these conditions, they will, presumably, attach high weight to the benefits of developing additional capacity so that expected shortages can be averted. Project developers that value highly the implementation of projects are likely to be more capable of providing compensation in order to reach settlements with regional electorates.

Modelling distributional influences

The interaction of these distributional effects of project implementation will be important in shaping the broad bargaining environment within which settlements are negotiated. That environment may be more or less conducive to rapid settlement, depending on the strength and direction of these various influences and the ability of promoters to compensate adequately disadvantaged interests.

The relationship between these distributional and other influences outlined in the previous section and the variation in settlement times can be stated, formally, in the following general model:

$$PAT = f(CR^{s}, PR^{d}, OI^{sd}) \qquad (3.1)$$

where **PAT** is the public acceptance time or time necessary to reach a social and political settlement over the development of energy projects,

CR^{s} are the factors that will shape the community responses to supplying sites on which to construct projects,

PR^{d} are the elements that will influence promoter responses to demanding sites on which to develop projects, and

OI^{sd} are other factors, such as uncertainty about outcomes, the allocation and use of bargaining power and changed expectations, which will also influence the regional community and promoter responses to the development of projects.

The supply of sites will be a function of the factors isolated above.

$$CR^{s} = g(EC,R,RS,LI,SA,OI^{s}) \qquad (3.2)$$

where **EC** is the environmental cost expected to be incurred by the regional community,

R is the perceived level of risks of different types of projects,

RS is the effect of the rural sector,

LI is the effect of leftist political party representation,

SA is the effect of prevailing social attitudes towards the development of projects, and

OI^{s} are other factors, such as defined in (3.1) that will influence a community's response to reaching a settlement.

The demand for sites is, in turn, a function of two main elements.

$$PR^{d} = h(ES,OI^{d}) \qquad (3.3)$$

where **ES** is the effect of expected electricity shortfalls on a promoters willingness to develop a project, and

OI^{d} are other factors, such as defined in (3.1) that will determine a promoter's response to concluding a settlement.

It is possible to provide a measure of the relative importance of these distributional and other influences on the variation in settlement times required to reach social and political settlements over the construction of projects. Quantification of these distributional elements would allow explanation of the variation in settlement times based on (3.1) through the use of regression analysis.[11] For example, it is possible to regress a settlement leadtime variable against explanatory variables which provide some measure of social and economic opportunities and promoter needs in situations where settlements have been reached. A per capita income variable may be used as a proxy measure of the level of social and economic opportunities. It might be expected that settlement times would be longer in situations where incomes are relatively high. One hypothesis is that communities would likely place relatively less weight on the marginal expansion of income and relatively more weight on the incremental impairment to the environment arising out of project development.

Regression analysis can be employed to indicate the proportion of variation in approval times explained by a set of quantifiable explanatory variables. Some measurement of distributional and other influences, and the regression of a leadtime variable on them will allow the estimation of the overall strength and direction of a quite complex set of influences working in different ways upon project delivery

----

11. For a discussion of regression techniques, see Draper N.R. and Smith H., **Applied Regression Analysis**, John Wiley and Sons Inc., New York, 1966, Kane E.J., **Economic Statistics and Econometrics: An Introduction to Quantitative Economics**, A Harper International Edition, 1969, and Wonnacott R.J., and Wonnacott T.H., **Econometrics**, second edition, John Wiley and Sons, New York, 1979.

times. For example, settlement times may tend to be short in situations where there are relatively large expected electricity shortages. This influence may be qualified by the perceived risk involved. Pro- or anti-development parties within the community will, in turn, qualify these two influences. Hence, on balance, it may be possible to estimate the strength and structure of these influences through regression analysis.

It is useful and interesting to identify, if possible, the importance of general distributional influences, as distinct from site-specific factors, on project settlement times. For example, the expected electricity shortage is likely to be a factor influencing the willingness of promoters to develop projects and the speed of settlement at all sites. This influence is, therefore, likely to be a general factor associated with the degree of difficulty of reaching settlements. In contrast, there may be a certain pattern of property right ownership unique to a particular site which either impedes or facilitates bargaining at that site in a way which is not evident at other sites.

A model can be set up with the aim of providing results which will assist in the assessment of settlement times. The settlement process takes time and, therefore, expected distributional influences at the point in time when a community is asked to accept a project as well as during the settlement process are likely to affect the speed at which settlements can be negotiated. Models which examine expectations about the distribution of costs and benefits during both time periods will be necessary in the assessment of settlement times. This approach will provide a way of analysing the extent to which approval times can be predicted accurately at the point in time when communities are asked to accept projects and whether it is also important to monitor carefully expectations during the settlement process in the assessment of approval times.

The results of the regression analysis could provide a way of identifying sites where distributional influences appear to be good predictors of delay and areas where they are not. The model could be set up with the aim of predicting settlement times for each observation based on a fitted equation, and to line predicted values up against actual or observed settlement times. The residual, the difference between the fitted and actual time, provides information on the extent to which and the direction in which, the model is under- or over-estimating settlement times for each observation. The residual, therefore, provides a starting point for the analysis of the extent to which other factors, such as uncertainty about outcomes, the allocation and use of political power, the skill with which bargaining strategies are employed, and changing expectations, appear to be important in explaining shorter or longer settlement times than might be inferred simply from any general association between distributional influences and leadtimes. These factors are not easily susceptible to quantification and cannot be readily incorporated into an econometric model yet will influence settlement times in a complex way. It is necessary to supplement the regression analysis with case history studies. These case studies will allow generalisations to be made about the nature and importance of a variety of other factors which are likely to impede or facilitate settlement processes.

Uncertainty

Distributionally weighted benefits and costs may not be known with certainty. There may be a lack of knowledge or information about the value of projects. Settlements will be affected by uncertainty regarding the expected costs as well as the benefits of developing projects. Promoters may be uncertain as to the extent of expected economic benefits that will accrue as a result of the construction of a project. Particular regional community interests may be uncertain as to the expected environmental costs that will be incurred as a result of the development of a project.

Uncertainty as to expected benefits and costs is likely to influence the effectiveness of compensation mechanisms which presume known outcomes. If there is a high level of uncertainty about costs, higher benefits or more compensation may be required to justify the project. It is likely that, all other things being equal, settlement processes would be longer in situations where uncertainty prevails than in situations where community interests are completely certain about the expected value of projects. Under conditions where a high level of uncertainty prevails, regional parties may not be willing to negotiate with promoters over the implementation of a project. They may demand more information on the nature of costs or more compensation to offset those uncertain costs.

The allocation of political resources

Even if distributional impacts and the level of uncertainty were the same for all projects the speed at which the settlement is reached will be influenced by the allocation and use of bargaining power. All settlement processes are biassed because the structure of social and economic power, however it is ordered, favours some actors over others. These biasses will confer privileges on some interests in the use of economic and political resources and this will determine their ability to influence the settlement process.[12]

The nature and pattern of these biasses will depend on the history of a region's social and economic development and the decision-making structures that have emerged as a result of that history. There will be a structure of property right ownership, historical relationships between various regional interests, and institutional procedures, such as access to decision-making centres, which will give more

----

12. See Schattschneider B.E., **The Semi-Sovereign People**, Holt, Rinehart and Winton, New York, 1960 for a general discussion of biasses in political systems.

weight to certain actors than to others in regional decision-making processes.[13]

The structure of property right ownership may confer more bargaining power on certain actors than others. Certain economic groupings may have legally defined property rights which need to be relinquished prior to the development of projects. Property right owners are likely, in general, to be economically and politically influential in settlement outcomes. The ability of these and other interest groups to influence bargaining outcomes will be determined by factors such as: size, value of output derived from the property right; the relative importance of output in the local economy; economic structure of the group and established relationships with other interests. Approval is likely to

----

13. Bachrach P., and Baratz M.S., **Power and Poverty: Theory and Practice**, Oxford University Press, London, 1972. For analyses of the structure and determinants of political power, influence and authority, see Dahl R.A., 'The Concept of Power', **Behavioural Science**, Vol.2, July 1957, Dahl R.A., 'The Analysis of Influence in Local Communities' in Adrian C.R., **Social Science and Community Action**, East Lansig, Michigan, 1960, Schulze R.O., 'The Role of Economic Dominants in Community Power Structure', **American Sociological Review**, Vol.23, February 1958, Polsby N.W., 'Three Problems in the Analysis of Community Power', **American Sociological Review**, Vol.24, December 1959, Polsby N.W., **Community Power and Political Theory**, second edition, Yale University Press, New Haven, 1980, Polsby N.W., 'How to Study Community Power: The Pluralist Alternative', **Journal of Politics**, Vol.22, August 1960, Rossi P., 'Community Decision Making' in Young R., ed., **Approaches to the Study of Politics**, Evanston, Illinois, 1958, Wolfinger R., 'Non-Decisions and the Study of Local Politics', **American Political Science Review**, Vol.65, December 1971, Merelman R.M., 'On the Neo-Elitist Critique of Community Power', **American Political Science Review**, Vol.62, June 1968, Anton T.J. 'Power, Pluralism and Local Politics', **Administrative Science Quarterly**, Vol.7, March 1963, and Banfield E.C., **Political Influence**, Free Press, New York, 1966.

be longer in situations where large and powerful property right owners expect to incur substantial losses as a result of project development.

The structure of the relationships between various community actors may also impede or facilitate settlement processes independently of interests affected by a particular project. Some regional actors may have conflictual relationships with others and these relationships may not be related directly to issues around settlement on a particular project. Factionalism within top echelons of regional decision-making units may delay settlement processes even if all the actors place a high social and economic value on developing projects. In other situations, relationships among influential actors in regional political systems may be structured in a way which facilitates economic and political accommodation among regional interests with very different preferences about particular projects.

Access to key decision-making centres may affect bargaining over the development of energy projects. Some interests have institutional or political access to regional decision-making structures. The extent of this access will depend on such factors as: the magnitude of electoral support to regional and national politicians, the importance of those interests in regional economic activity, and relationships with other interests. Community interests may be capable of influencing directly the settlement process. Access in other cases may not be direct and actors may be privileged with indirect access by virtue of economic and political relationships with others who have direct access to decision centres. Affected parties, who have either direct or indirect entry into regional decision-making, may be able to delay or facilitate bargaining. For example, interests who do not stand to incur large losses from project development may, be able to, by virtue of their access to political decision-making, impede settlement processes.

The effectiveness of bargaining strategies

The effectiveness with which community interests can develop and employ economic, political, technical, and informational strategies will also be a factor influencing the speed at which settlements can be negotiated. These strategies will be aimed at altering distributional effects of projects, the distribution of social and economic power or both in a way which either impedes or facilitates settlement on a particular project development.

Suppose there is only one property right owner or that regional distributional concerns have been taken into account by redistributive mechanisms which are operating perfectly. Assume that all bargaining processes are independent of each other and that there is no extraneous interference in the negotiating process. In principle, there could be two extreme bargaining outcomes, or a range of outcomes intermediate between the two outcomes. At one extreme, there might be an instantaneous settlement where promoters value a project very highly and, therefore, could be capable of compensating a property right owner immediately. At the other extreme, a property right owner may not wish a settlement. A property right owner who expected very large unfavourable effects from project development and had the political capacity to influence the settlement process indefinitely would delay to the point where the incremental cost of delay to a promoter would be so great that alternative locations would be preferred. Under these circumstances, a property right owner would not wish to reach a settlement, and delay would, in effect, be infinite.

In most cases, however, the time necessary to reach settlements will be somewhere in between these two extreme cases. Promoters are likely to wish to minimise the amount of compensation they pay while property right owners are likely to wish to maximise the amount they receive in return for relinquishing their property rights. Both private promoters and regional interests may not be prepared to reach settlements if they perceive that they can, by delaying the process, increase their share of the expected economic surplus generated from the project. For instance, private promoters would not be willing to negotiate a settlement quickly with a property right owner if it assessed that demand for project output was not likely to increase in the future.

Scheduling negotiations between regional interests

There will usually be more than one property right owner with whom a private promoter has to negotiate. There may, say, be two actors with legally defined property rights. Under these conditions, promoters will need to consider the scheduling of negotiations between, and allocation of the compensation among these actors. If negotiations were completely independent of each other then, all other things being equal, the only factor that would influence settlement times, would be the ability of the promoters to organise concurrent negotiations.

Bargaining processes may not, however, be totally independent and actors may have different bargaining strengths. The scheduling of negotiations may have important economic and strategic impacts on the positions of promoters and property right owners. Promoters may decide to negotiate with the weaker actor first. This strategy will be advantageous and reduce opposition to the settlement.[14] The amount paid to a weaker party may act as a benchmark for negotiations with the stronger property right owner. It will also allow a relatively larger compensation pool to be used in reaching a settlement with the stronger party.

This strategy may, however, inject instability into bargaining and influence the speed of the settlement process. The payment of compensation to a weaker interest may influence the bargaining relationship between the promoter and the stronger property right owner. It may strengthen a promoter's position by isolating the stronger actor. At the same time, the stronger party may perceive that its position is being threatened and may seek to

----

14. O'Hare M., 'Not on My Block, You Don't....Facility Siting and the Strategic Importance of Compensation', **Public Policy**, Vol.25, Fall 1977.

mobilise resistance to project development. The way in which groups respond to potential or actual compensation offers injects dynamic bargaining elements into the settlement process.

Promoters or regional community interests may respond to the potential or actual payment of compensation by the employment of various strategies aimed at improving their bargaining positions. These strategies may include economic, political, technical, informational or some combination of those elements. These strategies will aim to alter the expected distribution of benefits and costs, including perceptions of risk and uncertainty, and the allocation of political bargaining power.

Third party intervention

Community interests may attempt to alter the existing allocation of economic and political biasses by bringing third parties who are able to influence bargaining, in a way more or less consistent with their preferred outcomes, into the settlement process. Whoever they may be, third parties will act to mediate between uncompromising interests or to exert economic or political pressure on those interests in a way which either speeds up or slows down settlement processes.

The extent to which third parties, such as government officials or politicians, are prepared to enter the bargaining process is likely to be determined by the social and political value that they place upon the development of projects. For instance, prefectural governments, even if they place a high social and economic value on projects, may not be prepared to promote project implementation because of potential political ramifications, such as widespread local resistence to prefectural policies or loss of support in forthcoming elections. In other cases, national governments may enter regional decision-making arenas and attempt to facilitate a settlement because of the social and economic consequences of not being able to achieve regional and national policy objectives.

Alliance and committee formation and maintenance

Community interests will not usually be able to influence compensation processes unilaterally. They may attempt to improve their bargaining positions by forming alliances or developing other forms of organisational relationships, such as committees, with other regional interests. Community interests are likely to enter into such arrangements, when they, in conflict or competition with others, expect to be able to improve their bargaining positions more effectively by joining forces than unilaterally.[15]

----

15. See Groennings S., Kelley E.W., Leiserson M., eds., **The Study of Coalition Behaviour: Theoretical Perspectives and Cases From Four Continents**, Holt, Rinehart and Winston Inc., New York, 1970, Kelley E.W., 'Techniques for Studying Coalition Formation', **Midwest Journal of Political Science**, Vol.12, 1968, Ricker W.H., **The Theory of Political Coalition**, Yale University Press, New Haven, 1962 and Hinkley B., eds., **Coalitions and Time: Cross-Disciplinary Studies**, Sage Publications, London, 1976, for various analyses of coalition formation and maintenance.

For such arrangements to be formed and maintained, the anticipated benefits will need to be greater than the costs.[16] There are four main elements in the formation and maintenance of such relationships. They are situational elements, motivational elements, compatibility elements and strategic and tactical elements.[17] The willingness to make trade-offs between or compromise on these four elements is likely to be important. For instance, two or more regional groupings might be opposing a project independently. Entering into an alliance relationship may be expected to lead to costs, such as political isolation from mainstream interests in the regional electorate and the cost of compromise on other issues. The expected benefits in terms of being able to delay or cause abandonment of the project by joining forces, would need to be greater than the potential costs of compromising on other issues for the arrangement to be formed. Conversely, such arrangements are likely to dissolve when the costs of maintaining them exceeds the benefits.[18]

The extent to which such organisational arrangements are successful in influencing bargaining processes is likely to be influenced by their ability to appeal simultaneously and

----

16. See Groennings S., **op.cit.**, pp.447-457.

17. Refer to Lipsky M., 'Protest as a Political Resource', **American Political Science Review**, Vol.67, December 1968, for a fuller analysis of the factors which determine the effectiveness of protesting.

18. Groennings S., **op.cit.**, pp.447-457.

effectively to constituencies which actually or potentially possess political clout in regional decision-making. These include the organisation's own membership base, regional and national assemblies, the public at those levels, and other regional groups who support the interests of the organisation. Efforts to appeal to any of these constituencies may be affected by relationships with other constituencies.[19] For instance, certain members may be dependent financially on outside resources, such as subsidies from prefectural and national government budgets. The need to consider the costs of government pressure and potential discontinuation of those funds may influence positions on a particular project development.

The formation and maintenance of alliance arrangements is likely to have a bearing on settlement processes in four ways. First, it may isolate certain actors from actual or potential negative agents with different preferred outcomes.[20] Second, it may serve to provide a forum in which to discuss and agree on compromises relevant to the bargaining process. Third, it is likely to be important in managing conflictual relationships within or amongst groups which may prevent bargaining. Fourth, it provides a base from which to influence actors within the alliance who may be affecting adversely the settlement process.

----

19. Lipsky M., **op.cit.**, p.1144

20. See Bachrach P., and Baratz M.S., **op.cit.**, pp.44-47.

The supply of information

The extent to which community actors can supply relevant information may be important in the settlement process.[21] The supply of information, depending on the nature and content of that information may assist in reducing or exacerbating uncertainty about the costs and benefits of project development. Information may be supplied by interests promoting as well as protagonists opposing projects. It may be propagated by a variety of means such as through the distribution of pamphlets, personal discussion, the media and lecture series.

An important factor influencing the success of information strategies will be the ability to use the demonstration effect. This is likely to be critical in changing perceptions about risks and uncertainty given possible confusion about the reliability of divergent sources of information. Regional community interests may be more prepared to make judgments on the costs and benefits of projects after seeing similiar projects in operation than through relying on conflicting information which is abstract in nature and which may be regarded as more open to falsification.

----

21. The work of Dorothy Nelkin is particularly relevant in the area of the role of experts and the supply of information in the siting of nuclear power stations. See, for example, Nelkin D., 'Technical Expertise as a Political Resource: A Power Plant Siting Controversy', **The Bulletin of Atomic Scientists**, September 1974, Nelkin D., 'The Political Impact of Technical Expertise', **Social Studies of Science**, Vol.5, January, 1975, and Nelkin D., 'The Politics of Participation and the Nuclear Debate: A Comparative Study', **Public Policy**, Vol.25, 1977.

Interests involved in the settlement process may take certain individuals and groups within communities to other localities where projects are operating or under construction and expose information in a way which is conducive to the perceptions they are attemptng to formulate. For example, promoters will prefer to show individuals and groups projects which have relatively good safety records. Under those circumstances, they may be able to demonstrate to certain individuals and groups that the risks of the project are not as great as had been expected and that other similiar communities were willing to accept those risks in return for the benefits derived from project development.

Project design modification

The bargaining strengths of actors may be influenced by the extent to which technical and engineering fixes, such as design changes, are possible. These may include small changes, such as modifying the size of, say, water inlet and outlet pipes, to substantial modifications, such as changes in plant location within the electorate and the scale of projects. Promoters are likely to assess the cost of such changes in relation to the benefits in terms of an improved bargaining position vis-à-vis certain interests who may be delaying project implementation. For example, changes in plant location may require purchasing additional land and reclamation. At the same time, it will necessitate compensating other actors in order to reach settlement. The cost of these modifications may be less than the cost of delay in negotiating with relatively strong opponents at the original location. Changes in plant location may substantially weaken the political capacity of actors at an original location.

Power project design modifications will increase the bargaining position of interests at the new location. The extent to which those changes facilitate bargaining at the new location will depend on factors such as: the distribution of costs and benefits; the allocation of bargaining power and relationships between communities at the old and new locations. There may be resistance by local communities to promoters moving projects into other administrative units, because of a decline in benefits, such as taxes, which accrue from project development. Taxes, such as fixed assets taxes and road taxes, are usually confined to the administrative unit in which the reactor or boiler is located. In these situations, the extent to which promoters are willing to compensate communities for loss of expected benefits may be important in the determination of settlement outcomes.

Regional redistribution

The payment of compensation to property right owners may not only influence a promoters bargaining position vis-à-vis those interests. It may also affect the bargaining position with the local public or sections of that public who may argue that certain groups are gaining from project development at the expense of the regional community in general. Private promoters may not have the capacity to bargain with and compensate the whole regional community, particularly if there is more than one local electorate involved in the settlement process. The extent to which other redistributive mechanisms are operating effectively may, therefore, have an important impact on the time necessary to reach settlements.

Private promoters may not be the only actors capable of compensating regional communities for losses expected to be incurred as a result of project development. Other communities, such as prefectural or state, or national communities, may be willing to redistribute some of the expected surplus from projects to regional communities in order to speed up settlement processes. This may be in the form of direct compensation or subsidies to regional communities. Alternatively, it may be in the form of indirect subsidies to private promoters who can use the funds to increase their compensation pools. These mechanisms, whether direct or indirect, act to increase the share of the economic surplus which can actually be redirected to regional communities.

A major objective of such subsidies is to reduce potential or actual community resistance to project development by providing funds for the purpose of developing social community capital such as road, parks and hospitals. Public resistance to projects may emerge during property right negotiations. The community may argue that property right owners are receiving benefits from project development at their expense. It may, therefore, require benefits, such as the provision of public goods, in return for their approval of the project. The willingness of promoters to respond to such community demands may influence the speed of settlement.

Even if payment is guaranteed by institutional arrangements, the degree to which it is effective in shortening settlement times may also depend on the timing of payment. For example, these mechanisms may be designed to facilitate community acceptance by providing payment after settlement has been reached. Regional communities may be able to argue effectively that such mechanisms only provide potential benefit and that prior benefit will be required to secure community approval. They may take into account the increased compensation pools of private promoters and delay may occur while they pressure private promoters into negotiating separate community compensation arrangements.

The revision of expectations

During the settlement process expectations about the value of projects and the bargaining positions of actors may change. Revised expectations may occur as a result of events exogenous to and, therefore, not under the control of interests participant to bargaining process. These changes may lead to a divergence between what was expected to occur and what actually occurs. The extent to which actors are capable of taking into account such changes may influence expected benefit-cost ratios and, consequently, may influence the speed at which settlements take place.

Those with property rights, for example, may, for some reason, revise their estimates of the future value of their rights. The benefits of receiving compensation may then be seen in an important mechanism for diversifying into alternative forms of employment. The speed at which property right owners revise expectations about the value of property rights may influence the time required to reach a settlement. All other things being equal, it might be expected that owners will wish to reach settlements more quickly in situations where expectations about the value of property rights are revised downwards.

Promoters may also revise their expectations about the value of projects. The demand for project output may change due to market forces. It may also change due to revised promoter or national policy objectives with respect to the development of projects. Economic or policy related factors may lead to a downward revision expected demand for project output. Under these conditions, promoters may prefer intentionally to delay reaching settlements with regional communities.

Scheduling negotiations between projects

The settlement process at any particular locality may not simply be a function of economic and political bargaining between promoters and regional communities at that location. Project promoters may be attempting to reach settlements simultaneously with communities in other localities in order to develop projects to meet demand for project output. Delay in reaching a bargain with any one electorate may be influenced by the scheduling of projects at alternative locations.

The extent to which promoters are prepared to reschedule project development is likely to depend on the re-assessment of the relative costs of the development of projects at alternative locations. Among other factors, this will be influenced by the size of the project in relation to expected demand for output, the availability of purchasing output from alternative sources, the relative construction costs of competing projects, broad promoter project management policy, and the relative compensation requirements in reaching a settlement with the other electorate.

Promoters may delay settlement processes at a location if they re-assess that the costs of locating and constructing projects at alternative locations are smaller. For instance, a promoter, after revising benefit-cost calculations, may prefer to attach priority to developing an alternative project with a relatively smaller construction cost or a shorter leadtime. This may influence the settlement process at the former site because promoters could delay the process while not compromising on the supply of project output.

The assessment of delay

Standard CBA, while useful for some purposes, such as ranking the development of projects in terms of economic efficiency criteria, does not provide an adequate and reliable framework for assessing settlement times or the social and political factors influencing varation in those times. The approach can be extended to incorporate compensation management and other 'non-economic' factors and to provide a more comprehensive framework for examining the times taken to reach settlement over the construction of projects. A critical element is focussing on the distributional effects of projects and, hence, the effectiveness of compensation mechanisms in explaining why public acceptance at some sites takes more or less longer than at other sites.

The need for a settlement process arises out of a disparity between the value of projects to promoters and regional communities. The process takes varying amounts of time, and is characterised by bargaining between promoter and regional community interests over an acceptable distribution of costs and benefits expected to accrue as a result of project development. The distribution of social and economic costs and benefits will determine the extent to which aggregate benefits exceed costs or the economic surplus which is available for redistribution from promoters to regional interests in order to conclude a settlement. Compensation mechanisms are not likely to work effectively and settlements are likely to take longer where there is little economic surplus available for redistribution and where those mechanisms do not or cannot take into account fully the distributional influences on affected parties consequent to a particular project development.

It is possible to develop a model for providing some measure of the overall importance of distributional effects such as: the expected environmental costs of projects, the size of the rural sector, the ideological orientation of the community, the risks of different types of projects, prevailing social attitudes toward preservation of the environment, and the need to install additional capacity to meet expected electricity demand on the variation in times taken to reach settlements over the construction of energy projects in Japan. The model can be set up to identify areas where distributional influences appear to be good predictors of delay and areas where they are not. It, therefore, provides a useful starting point for the analysis of other factors, such as uncertainty about outcomes and the allocation and use of political power, the effectiveness with which bargaining strategies are employed and changing expectations which will assist in the assessment of why some projects take longer or shorter times than average settlement times to implement. These latter factors are not readily susceptible to statistical measurement, yet may be important in determining settlement outcomes in certain situations.

The following chapter attempts to quantify and provide a statistical measure of the relative importance of distributional and other influences on project construction start-up times. It considers the extent to which econometric models are useful in the evaluation of public acceptance times. The chapter also identifies areas which will be subject to case history study analyses, considers the extent to which they are predicted accurately by the model and sets the focus for the case studies in chapters 5 to 8.

THE MEASUREMENT OF DISTRIBUTIONAL INFLUENCES

Expectations about the distribution of costs and benefits affect the responses of both promoters and regional communities toward developing or accepting energy power projects. These responses act to facilitate and impede settlement processes over the construction of both nuclear and fossil-fuelled energy facilities. It is possible to measure quantitatively the social and economic factors which are likely to shape promoter and regional community responses to energy projects and, through regression analysis, to provide a measure of the relative importance of distributional influences on settlement times. The development of siting models which aim to examine systematically these and other influences, such as political influences, will be useful in assessing the degree to which sensible predictions about settlement times can be made.

Despite the complexities of the relationship between the distribution of benefits and costs and settlement times, there are important generalisations which can be made about the nature and importance of distributional influences on settlement times. The responses to the development of energy projects will depend on the structure of the regional political economy and the need for promoters to install projects to meet forecast electricity demand increases. Evidence is presented to support five major propositions. First, settlement times will be shorter in prefectures where incomes are rising relatively quickly and there are expectations for continued expansion of those incomes. Second, approval times tend to become longer after the early 1970s, a period where social attitudes started to place emphasis on environmental quality and welfare. Third, times for winning consensus are longer in situations where electricity shortages are forecast to be relatively insignificant. Fourth, settlement times are generally shorter for subsequent packages because the local economy becomes dependent on continued plant construction and the community becomes familiar with energy projects operating in their electorates. This is qualified by relatively more resistance in situations where the rural sector is relatively large, because of additional perceived environmental degradation from subsequent packages. Fifth, approval times for nuclear projects are longer in situations where the rural sector is relatively large and where leftist political party representation is relatively high. The resistance to nuclear projects appears to be counter-balanced by community support for those projects in situations where there are strong expectations for continued economic growth.

These generalisations appear to explain a considerable proportion of the time required to reach social and political agreement over the construction of energy projects in Japan. The models developed in this chapter appear to provide a reasonably good basis upon which to evaluate settlement times. Predictive models, which attempt to use information about expectations prior to or at the time of a decision to locate power plants, are useful in assessing public acceptance times. These assessments can be improved if influences upon expectations during the settlement process are also taken into account and monitored carefully.

These models can be set up to allow for the analysis of other factors, such as uncertainty, the allocation and use of political power, the effectiveness with which bargaining strategies are employed and changing expectations, which are not readily quantifiable, yet will also presumably influence the speed at which settlements can be negotiated. The models identify areas where distributional influences are good predictors of delay and areas where they are not. The extent to which these models under- or over-estimate settlement times can be examined by considering the residuals between fitted or estimated times and actual times. These residuals provide a useful starting point for the analysis of other factors, such as changing expectations, which will also affect settlement processes. Case study analysis will allow generalisations to be made about the nature and importance of these other factors and this will improve the ability to evaluate energy facility construction start-up times.

Modelling distributional influences

There are three steps in the regression analysis introduced in Chapter 3 which aims to assess the importance of distributional influences on the variation in public acceptance times. The first is the formal specification of the variables which provide surrogate measures of distributional influences. The second is developing hypotheses as to their expected relationships with settlement times. The third is estimating the co-efficients of the variables and testing the hypotheses developed. In the development of a comprehensive siting model, a number of different regression models will need to be considered. The models will take into account power plant characteristics, such as fuel type and package number, and the value of the variables at distinct stages, such as before the commencement of negotiations and during the settlement process.

A Model for assessing public acceptance times

The factors which are expected to influence settlement times and outlined in Chapter 3 in **3.1** can be specified in the following way:

$$\mathbf{PAT} = f[\mathbf{EC}(\mathbf{IN},\mathbf{LFI}),\mathbf{RS}(\mathbf{PC},\mathbf{PE}),\mathbf{R}(\mathbf{F},\mathbf{PN}),\mathbf{LI},\mathbf{SA},\mathbf{ES}(\mathbf{ES}^{ng},\mathbf{ES}^{pc}),\mathbf{OI}^{sd}] \quad (4.1)$$

where **PAT** is public acceptance time measured in Chapter 2 and, defined as the time from a company decision to locate a power plant to the time of Denchōshin approval,

EC is the expected environmental cost associated with the development of energy projects and will be a function of two main elements.

$$\mathbf{EC} = f^{h}(\mathbf{IN},\mathbf{LFI}) \quad (4.2)$$

where **IN** is per capita income,

LFI is a local financial index, or the ratio of tax revenue from regional sources to expenditure on public goods by regional government;

RS is the response of the rural sector to accepting an energy project and will be determined by the following function:

$$RS = f^i(PC, PE) \qquad (4.3)$$

where **PF** is the number of persons employed in the rural sector as a proportion of the total number of persons employed, and

PC is primary product per capita as a ratio of total product per capita,

R is the risk involved in accepting different types of projects and will be determined by the following equation:

$$R = f^j(F, PN) \qquad (4.4)$$

where **F** is fuel category such as nuclear or fossil-fuelled and

PN is package number such as initial or subsequent package,[1]

LI is the ratio of Japan Communist Party (JCP) and Japan Socialist Party (JSP) assembly seats to total assembly seats,

----

1. It will be recalled from Chapter 2 that power projects in this study are not treated as individual units but as packages where a package can consist of one or more power plants. The first package of plants at any given site is defined as an initial package. A subsequent package is where project development is attempted at a location where there is at least one plant in the licensing stage, under construction or operating.

SA is the time period in which the settlement was negotiated,

ES are promoter expectations about future electricity shortages, and will be determined by the following function:

$$ES = f^k(ES^{pc}, ES^{ng}) \quad (4.5)$$

where ES^{pc} is the expected electricity shortage in power company spheres,

ES^{ng} is the national government's expected electricity shortage in regional electricity spheres,[2] and

OI^{sd} is the residual or the summary measure of the importance of other factors influencing the willingness and ability of regional communities and promoters to negotiate over the development of power projects and includes factors such as: changing expectations, uncertainty about outcomes, the allocation and use of political power, and the effectiveness with which bargaining strategies are employed.

The backward regression technique, contained in the SPSS statistical package was used to estimate the co-efficients of the variables expected to influence public acceptance times and to test the hypotheses developed. Backward regression enters all the selected variables into the model, deletes the most insignificant variable and continues this process until only variables with a significance level of 90 per cent or above remain in the model.

----

2. Refer to Map 2.2 in Chapter 2 which shows power company and national government electricity spheres.

Table 4.1 illustrates the extensions of (4.1) that will be considered. The first distinction which is made is that between predictive and explanatory models. The predictive model considers how much of the variation in public acceptance times can be explained in terms of the conditions at the point in time when a power company makes a decision to locate an energy project in a particular area, given available information about expectations at that time. This model takes the value of the variables prior to or at the time of the decision to locate a power plant.[3] The explanatory model, in contrast, takes into account conditions during the settlement process and considers the proportion of variation in public acceptance times which can be explained in terms of these.[4] The evaluative model takes into account pre-site selection conditions as well as conditions which change during the course of settlement.

----

3. In the predictive model, information relating to social and economic conditions is considered for a three year period prior to a power company decision to locate a project in a particular area. An alternative and, perhaps more appropriate period for assessing social and economic conditions, is from the time of the previous election prior to the decision to locate the project. This may provide a better assessment of regional expectations before the commencement of the negotiating process as those expectations would likely be shaped by the electoral process of deciding between alternative leaders. There are, however, several measurement problems with this approach to assessing regional expectations. Prefectural and local elections are not held concurrently; many elections on the regional level are uncontested; and in some cases data for the relevant explanatory variable is not available in the election year. While the three year cut-off point is arbitrary, it does give some indication of trends in social and economic conditions prior to the settlement process.

4. Expectations during the settlement process are considered from the year a power company decided to locate a project to the year when Denchōshin approval was given to develop that project.

TABLE 4.1

DEVELOPING MODELS FOR THE ASSESSMENT OF PUBLIC ACCEPTANCE TIMES

	Predictive Model (b)	Explanatory Model (e)
Basic (b)	$PAT = f^{bp}(.)$ [a] [b]	$PAT = f^{be}(.)$
Facility Characteristics (f) [c]	$PAT = g^{fp}[f^{bp}(.) + (f^{bp}(.) * PN)]$ $PAT = g^{fp}[f^{bp}(.) + (f^{bp}(.) * F)]$	$PAT = g^{fe}[f^{be}(.) + (f^{be}(.) * PN)]$ $PAT = g^{fe}[f^{be}(.) + (f^{be}(.) * F)]$
Intermediate (i)	$PAT = h^{ip}[g^{fp}(.),PN,F]$	$PAT = h^{ie}[g^{fe}(.),PN,F]$
Evaluative Model (em) [d]	$PAT = k^{em}[h^{ip}(.),h^{ie}(.)]$	

Notes:
a. Superscripts refer to the type of model. For example, the superscript bp refers to the basic predictive model.

b. (.) is the vector of variables contained in 4.1

c. PN: package number, F: fuel category

d. The evaluative model contains pre- as well as post-site selection data.

In the basic predictive and explanatory models, the influence of the variables on public acceptance times is presumed to have the same direction and magnitude irrespective of the characteristics of energy projects, such as fuel type and package number. Certain variables may, however, have stronger or weaker influences on settlement times when facility characteristics are taken into account.[5] There is, therefore, a requirement to allow for different plant characteristics such as fuel category and package number.

The development of the comprehensive model consisted of a number of steps. The first was the development of a basic predictive model which used data prior to or at the time of a decision to locate a power project at a particular site. The second was the elaboration of two models which took into account effects of both fuel category and package number. The models which allowed for the effects of fuel category and package number were then considered together with

----

5. Ideally, projects with different characteristics should be treated in separate regression models. A relatively small number of observations for each plant category in this study prevents this separate treatment. However, it is possible to consider facilities with different characteristics within the one general model. This is done with the use of dummy variables which indicate plant types such as fuel category and package number. For example, to consider nuclear and fossil-fuelled projects, a value of zero and one are assigned to a dummy variable (F) which indicates nuclear and fossil-fuelled projects respectively. This is multiplied by the value of the relevant explanatory variable, say the per capita income variable, and then the regression is run. The final result will show the effect of income on fossil-fuelled projects, as the value of income multiplied by zero (the dummy variable for nuclear projects) will be zero. By comparison with the nuclear case, the effects of the income variable on fossil-fuelled projects can, therefore, be considered.

statistically significant variables remaining in the basic predictive model. Statistically significant variables in each of the three models were pooled to generate the intermediate predictive model. The same procedure was used to yield the explanatory model which incorporates post-site selection data. The intermediate predictive and explanatory models were then pooled to generate the evaluative model.

Quantifying distributional influences

The next step in the analysis is specifying fully the explanatory variables, considering ways of measuring the variables and developing hypotheses about their relationships with public acceptance times. There is a need to consider variables identified in 4.1 together with the added variables which take into account facility characteristics such as fuel type and package number. Two points need to be noted with respect to the development of the hypotheses. The first is that because of the large number of variables only the statistically significant variables will be discussed. The second is that a number of hypotheses cannot be posited appriori. Under these circumstancs, competeing propositions are discussed.

The time required to reach settlements over the construction of energy power stations will be influenced by the willingness of regional communities and promoters to accept and develop those projects. These responses will be determined by the distribution of costs and benefits expected to accrue from a particular project development. The distribution of costs and benefits will shape the broad bargaining environment within which settlements take place. The bargaining environment will act as a positive or negative catalyst in the negotiating process.

Basic influences

Prefectural per capita income **(IN)** can be used as a measure of the wealth of an electorate. The hypothesis is that settlement times would be longer in areas where incomes were relatively high. The communities in those prefectures are likely to place less weight on a marginal increase in income. At the same time, they will, presumably, place more weight on the destruction of the physical and social environment which might be expected from the development of a project. Prefectural communities, are likely to be less willing to offer sites for energy projects where incomes are relatively high. Consequently, other things being equal, settlements are likely to take longer.

The trend rate of growth in prefectural per capita income **(R.IN)** may be used as a measure of expectations about future income opportunities.[6] As noted in Chapter 3, there are two

----

6. The trend rate of growth for the income and other variables is a measure of the average annual rate of growth in the relevant variable, say x, over a period between, say t^1, the starting year and t^2, the finishing year. The formula that is used to calculate the trend rate of growth is as follows:

$$Trg = \left(\frac{x^2}{x^1}\right)^{\left(t^2 - t^1\right)^{-1}} - 1$$

where Trg is the trend rate of growth,
t^1 is the starting year,
t^2 is the final year,
x^1 is the value of the relevant variable in t^1, and
x^2 is the value of the relevant variable in t^2.(cont)

alternative hypotheses about the relationship between the growth in per capita income and public acceptance times. This first is an extension of the above proposition and would suggest that settlement times are likely to be longer in situations where incomes are expected to rise rapidly. The second proposition is that income growth is associated negatively with public acceptance times. In prefectures where incomes are growing rapidly, the community may come to expect a continued expansion of those incomes. They may direct their attention to the benefits of rapid growth and there may be a lag in anticipating any environmental degradation associated with project development. Consequently, there may be less opposition to the construction of projects.

The local financial index (**LFI**) or the ratio of tax revenues from regional sources to expenditure on public goods by regional government can be regarded as a proxy measure of the ability of regional government to deliver public goods, such as administrative services and social overhead capital, to their respective electorates independently of outside financial assistance.[7] A relatively low value of the

----

6. In the predictive model, t^1 is a point in time three years prior to the decision to locate a power plant and t^2 is the year the negotiating process began. In the evaluative model, t^1 is the year the power company made a decision to locate the particular project and t^2 is the year Denchōshin approval was given to construct that project.

7. See Ishibara N., eds., **Shichōson no tame no sōgo zaisei shindan no shuhō** [A Diagnosis of Financial Measures for Regional Electorates], Daiichi hōki, Tokyo, 1979, pp.65-67.

financial index would suggest that a regional government does not have autonomy in providing public goods despite a community demand for them.

Large revenues in the form of fixed assets tax and other taxes accompany the construction of energy projects. It would, therefore, be anticipated that communities would be persuaded more easily to accept projects in areas where the value of the financial index was relatively low. In those areas, there may be a relatively strong incentive to offer energy sites in order to improve the ability of regional government to fulfill community expectations for public goods and services. The need for such goods may dominate the expected physical and social environmental costs of projects, and, therefore, there is likely to be less resistance to the development of energy projects.

The ratio of prefectural primary product per capita to total prefectural product per capita **(PC)** may be taken to indicate the productive capacity of the rural sector relative to other sectors in the regional economy.[8] Settlement times would be expected to be longer in areas where rural sector productive capabilities were relatively high. The rural sector in these areas is likely to give higher priority to preventing damage to factors of production, such as land and water resources, and less to the benefits of increasing the

----

8. It should be noted that the level of prefectural primary product per capita can be influenced by subsidies and other support programs. Nonetheless, it does provide a relatively good indicator of the productive capacity of the rural sector.

productive capacity of the economy in general. The rural sector would be less tempted to offer energy sites in relatively productive rural areas.

The ratio of persons employed in primary industry to total persons employed **(PE)** may be considered as a measure of the level of employment opportunities in the rural sector relative to non-rural sectors. Public acceptance times are likely to be longer in communities where rural employment opportunities are relatively high. The rural sector in these areas would be expected to place less importance on the expansion of employment opportunities arising out of project development and more weight on the anticipated environmental impairment which may affect adversely existing employment opportunities in that sector. Consequently, there is likely to be more resistance to offering energy sites in areas where there are relatively good employment opportunities in the primary sector.

The ratio of JCP and JSP to conservative prefectural assembly seats **(LI)** may be used as a measure for the relative strength of leftist parties to conservative parties in prefectural assemblies.[9] Negotiating public acceptance

----

9. The JCP and JSP are not the only opposition parties that become involved in and sometimes oppose the development of energy and, in particular, nuclear projects. In some cases, the **Kōmeitō** [Clean Government Party] and the **Minshatō** [Democratic Socialist Party] in addition to a wide range of other smaller regional political parties, oppose the development of energy projects. These opposition parties are, however, relatively small and, in general, do not play critical roles in establishing anti-siting movements. This observation is based on extensive interviews with officials of political parties in Japan about their attitudes and responses toward the development of energy projects during 1982 and 1983.

is likely to be more difficult in electorates where leftist party representation is relatively high.[10] The JCP and JSP and their respective constituencies usually attach higher significance to the environmental costs of energy projects and usually act to sensitise the public to those costs. Electorates with higher leftist party representation are likely to be more opposed to reaching settlements with promoters over the construction of energy facilities and, as a result, settlement times are likely to be longer in areas displaying these political characteristics.

The characteristics of energy projects, such as the type of plant and package number, may be used as proxy measures of the level of perceived community risk involved in accepting power plants. The plant fuel type **(F)**, indicated by a dummy variable of zero for nuclear and one for fossil-fuelled plants may be used as a proxy measure of the nature of risk involved in the development of nuclear and fossil-fuelled power stations. It would be expected, other things being equal, that the settlement process would take longer in communities being asked to give approval for nuclear energy projects. Because of the Japanese historical experience

----

10. This proposition presumes that the number of seats a particular political party occupies in a regional assembly is closely associated with their political strength, In Japan there is disproportionate representation between the Liberal Democratic Party (LDP) and opposition parties. The LDP can therefore win a relatively large number of seats even though their electoral strength may be relatively low. The ratio of JCP and JSP to conservative prefectural assembly seats does, however, provide some measure of the overall political strength of leftist political parties in regional politics.

with atomic weapons, regional electorates are likely to place a higher weight on the risks of nuclear projects relative to their fossil-fuelled counterparts. As a result, there is likely to be less enthusiasm for providing sites for the development of nuclear energy stations.

The package number **(PN)**, indicated by a dummy variable of zero for initial packages and one for subsequent packages may be regarded as a surrogate measure of the familiarity with the risk involved in energy projects. It would be anticipated that public acceptance times would be shorter for subsequent packages relative to initial packages. There is likely to be more familiarity with the risk of energy projects after they have been operating for some time. At the same time, there is likely to be concern about the reduction in benefits, such as employment opportunities, after initial projects have been constructed. Consequently, other things being equal, there is likely to be a stronger community incentive to offering sites for subsequent power plants.

Different climates of opinion about environmental costs at different times **(SA)** will affect settlement times. The particular period in which settlement were reached may be measured by a dummy variable of zero for projects completed before 1969 and one for projects completed after that year. Other things being equal, settlement times are likely to be longer in the post 1969 period relative to the period prior to 1969. After the late 1960s, there was a marked shift in Japanese attitudes away from high economic growth toward stress on welfare and the environment.[11] This change in community attitude was attributable directly to the more general emergence of pollution problems and a number of nuclear accidents which increased the concern about thermal pollution and the safety of nuclear energy. It would be expected that regional communities, after 1969, became less willing to offer sites for the development of energy facilities.

On the site demand side, expected electricity shortages **(ES)** are likely to influence the willingness of both private power companies and the national government toward the development of energy projects. Predicted five year electricity demand minus projected three year supply capacity may be used as a surrogate measure of expected electricity shortages. During any one year, there are likely to be a number of plants either in the licensing stage or under construction. As noted in Chapter 2, there is a reasonable amount of predictability in energy power plant leadtimes after Denchōshin approval and electricity planners are usually confident that three year projected capacity targets will be met. The divergence between expected five year demand and projected three year supply, therefore, provides some measure of the magnitude of expected electricity shortages.[12]

----

11. This shift in Japanese attitudes did not occur instantaneously; it occured over a period of time from the late 1960s. The year of 1969 does, however, provide a reasonably good indication of when attitudes toward the environment in Japan started to change.

12. Five year demand and three year supply projections were the only data available to the author. The (cont)

It would be expected, other things being equal, that settlement times would be shorter in situations where estimated three to five year electricity shortages were relatively high. Under these conditions, promoters are likely to attach more weight to the rapid implementation of energy projects to equilibrate electricity markets. Because of this they would presumably be prepared to incur greater costs in persuading regional communities to accept those projects and are likely to be more willing to pay compensation to regional communities. Consequently settlement times would be expected to be shorter.

Influence of fuel type and package number

The basic influences outlined above are presumed to influence settlement times in the same way for all types of energy facilities. Certain variables may, however, have a stronger or weaker influence on settlement times when facility characteristics are taken in account. There is, therefore, a need to consider, within both the predictive and explanatory models, effects of these influences on energy stations with different characteristics, such as fuel type and package number.

----

12. use of these projections presumes that power company capacity expansion plans are based on a five year time horizon. It is likely that power companies would have longer time horizons as average fossil-fuelled and nuclear leadtimes are 75 and 153 months respectively. Nonetheless, five year expected electricity shortages do provide some indication of the need for power companies to install new capacity. Information obtained from the Tokyo Electric Power Company in 1983.

Fuel type

The influences significant to fuel category are per capita income, the share of primary product per capita to total product per capita and the ratio of JSP and JCP prefectural assembly seats to total assembly seats. The variable **IN*F** indicates the effects of per capita income with respect to different fuel categories. The weight attached to the immediate environmental impairment by communities directly affected is likely to be greater in the case of fossil-fuelled projects than nuclear projects. Fossil-fuelled plants have been located close to large cities and towns with comparatively high levels of pollution. Those communities will presumably place more emphasis on the adverse effects of projects on the environment and less on the increase in income opportunities. In contrast, nuclear projects are generally located in rural areas with relatively low levels of pollution.[13] There is, therefore, likely to be a higher weighting placed on developmental benefits from the construction of nuclear projects and less on the potential immediate environmental costs of those projects.

The variable **PC*F** may be used to consider the varying response of the rural sector to nuclear and fossil-fuelled power plants. There is usually concern within the rural

----

13. See Seisaku kagaku kenkyujō, **Chiiki betsu enerugii kosuto no chiiki kaihatsu kōka ni kansuru chōsa** [Research on the Effects of Energy Costs and Regional Development by Prefecture], Seisaku kagaku kenkyujō, Tokyo, CR-80-30, 1981 for an analysis of the location of energy power plants in Japan in relation to the social and economic characteristics of those locations.

sector that an accident at a nuclear installation will lead to rumours about the contamination of rural produce grown and distributed in the prefecture and that those rumours will reduce the economic value of the produce.[14] Consequently, there is likely to be stronger resistance by the rural sector to delivering sites for nuclear power projects as compared to fossil-fuelled projects.

The variable **LI*F** can be used to measure the relative importance of leftist party influence in the determination of nuclear and fossil-fuelled project public acceptance times. It might be expected that leftist party opposition would be stronger in lengthening settlement times in the case of nuclear relative to fossil-fuelled power plants. Leftist groups generally place a high emphasis on the risks associated with nuclear energy stations. In contrast, they tend to place less emphasis on the environmental cost associated with fossil-fuelled power plants. Other things being equal, there is likely to be more resistance to nuclear plants compared to fossil-fuelled plants in areas where JCP and JSP political party representation is relatively high.

Package type

The variables which are significant to package number are the local financial index, the number of persons employed in the prefectural primary industry as a proportion of total

----

14. Information received from officials in MITI, the electric power industry, and **Zenkoku gyōgyō rengōkai** [Federation of Fishing Co-operatives] in 1983.

persons employed, the year in which the settlement was negotiated and expected electricity shortages in national government electricity spheres. The relative importance of the financial capacity of regional government in the determination of settlement times for initial and subsequent packages can be measured by the variable **FI*PN.** It would be expected that the incentive to accept power stations would be stronger for subsequent packages relative to initial packages. The construction of initial packages sets into motion a revenue surge which is mainly used for the development of public facilities. The financial benefits, such as fixed asset taxes, decline rapidly after the construction of initial power plants. Consequently, the capacity of regional government to provide funds for the further development of public facilities and the maintainence of those facilities declines.[15] As a result, the financial incentive to accepting energy projects is likely to be a stronger influence associated with shorter public acceptance times for subsequent packages.

The variable **PE*PN** can be used to illustrate the relative importance of rural sector employment opportunities in the determination of settlement times with respect to initial and subsequent packages. The response of the rural sector toward initial and subsequent packages will depend on perceptions of the risk involved in accepting those different packages. The primary sector employment influence

----

15. See Seisaku kagaku kenkyujō, **op.cit.**, for a discussion of the problem of declining fixed assets taxes after the completion of construction of energy power plants in Japan.

is likely to be a stronger influence in lengthening public acceptance times for subsequent relative to initial packages, if accidents occur and rural producers learn that power plants are more dangerous than initially feared. On the other hand, if no accidents occur, rural producers may judge that they were, initially, unrealistically fearful of projects and may become familiar with power plants operating in their vicinity. Consequently, they may be less concerned about the risks of subsequent packages.

The variable **SA*PN** can be taken as a measure of the relative importance of the change in regional social attitudes toward environmental quality after the late 1960s in the determination of public acceptance times for initial and subsequent packages. As noted in the previous section, the emergence of pollution problems in the late 1960s heightened concern about the quality of the environment. The extent to which public acceptance times for subsequent packages are shorter than for initial packages after the late 1960s will depend on the degree to which the familiarity with risk is offset against in general concern about the quality of the environment. In general, subsequent packages are likely to be more readily accepted if communities felt that they had become familiar with the risks involved in having projects operating in their vicinity despite a concern about the possible environmental degradation associated with the development of additional packages. Public acceptance times for subsequent packages are likely to be longer in situations where communities judged that they could not become familiar with the higher risk involved in accepting additional projects.

The variable **R.ES^{ng}*PN** may be used as an indicator of the relative impact of the growth of electricity shortages in national government electricity spheres on public acceptances times with regard to initial and subsequent packages. The response of the national government towards initial and subsequent packages in situations where electricity shortages are forecast to be large is likely to be a function of the relative value attached to developing those projects. The costs of initial packages are likely to be higher than subsequent packages because of the need to acquire property rights, complete community compensation arrangements and develop the necessary infrastructure.[16] Initial packages are, however, more important in the longer term because they increase the site pool on which subsequent packages can be developed. On the other hand, in situations where electricity shortages are expected to be large, the national government may seek to develop less costly subsequent packages in order to meet shorter term supply objectives.

Results of the analysis

Tables 4.2 and 4.3 illustrate the results of the predictive and evaluative models. The variables contained in the predictive model, which takes into account social and

----

16. These include the development of port facilities, roads and electricity transmission networks.

TABLE 4.2

PREDICTING PUBLIC ACCEPTANCE TIMES

Code	Predictive Variable	Estimated Co-efficient[a]	T-Ratio	Beta Co-efficient
IN	Prefectural Income	-4.69	8.49	-0.75
IN*F	Differential effect of IN on fuel type: F = 0 if Nuclear; F = 1 if Fossil-fuelled	2.44	7.10	1.15
LI	Ratio of JSP and JCP to conservative prefectural assembly seats	8.13	12.37	0.57
LI*F	Differential effect of LI on F	-7.14	5.32	-0.83
PC*F	Differential effect of PC on F	-8.96	7.00	-0.60
LFI	Local Financial Index	-0.44	4.04	-0.23
LFI*PN	Differential effect of LFI on package number: PN = 0 if Initial; PN = 1 if Subsequent	-1.00	5.39	-0.26
$R.ES^{ng}$	Trend growth in regional electricity sphere shortage	-0.01	3.17	-0.19
	Constant		6.43	
	R - Square		0.55	
	Standard Error		0.75	
	Degrees of Freedom / F-Ratio		8.40 / 6.00	
	Number of Observations		48	

The estimated relationship between public acceptance times and the predictive variables is:

$$PAT = 6.43 - 4.69IN + 2.44IN*F + 8.13LI - 7.14LI*F - 8.96PC*F - 0.44LFI - 1.00LFI*PN - 0.01R.ES^{ng}$$

Notes: a. The constant and the estimated co-efficients are measured in log of months of the relevant predictive variable.

b. Variables with R. indicate trend growth in those variables.

TABLE 4.3

EVALUATING PUBLIC ACCEPTANCE TIMES

Code	Explanatory Variable	Estimated Co-efficient[a]	T-Ratio	Beta Co-efficient
R.IN	Trend growth in Prefectural Income	-1.23	31.27	-0.92
R.IN*F	Differential effect of R.IN on F	0.91	13.40	0.80
P(LFI*PN)[b]	Differential effect of LFI on PN	-0.51	5.02	-0.39
PE*PN	Differential effect of PE on PN	4.80	6.90	0.64
P(PC*F)	Differential effect of PC on F	-8.79	10.80	-0.61
P(LI*F)	Differential effect of LI on F	-3.61	9.02	-0.41
SA	Social Attitudes: SA = 0 if 63 < SA < 69; SA = 1 if 70 < SA < 79	1.22	24.00	0.53
SA*PN	Differential effect of SA on PN	-0.01	6.69	-0.53
ES^{pc}	Company electricity sphere shortage	-0.26×10^{-3}	11.10	-0.32
$R.ES^{ng}$	Trend growth in regional electricity sphere shortage	-0.02	14.08	-0.54
$R.ES^{ng}*PN$	Differential effect of $R.ES^{ng}$ on PN	0.02	14.45	0.53
	Constant		4.98	
	R - Square		0.76	
	Standard Error		0.56	
	Degrees of Freedom F -Ratio		11:37 10.55	
	Numbers of Observations		48	

The estimated relationship between public acceptance times and the explanatory variables is:

$$PAT = 4.98 - 1.23R.IN + 0.91R.IN*F - 0.51P(LFI*PN) + 4.80\ PE*PN - 8.79P(PC*F) - 3.61P(LI*F) + 1.22SA$$
$$0.01SA*PN - 0.26 \times 10^{-3} ES^{pc} - 0.02R.ES^{ng} + 0.02R.ES^{ng} * PN$$

Notes: a. The constant and estimated co-efficients are measured in log of months of the relevant explanatory variable.

b. Variables prefixed by P indicate variables from the predictive model which considers social and economic conditions prior to or at the time of a decision to locate a power plant at a particular region.

economic conditions at the beginning of the settlement process, explains 55.0 per cent of the variation in public acceptance times. The evaluative model, which considers social and economic conditions at the beginning of the settlement process as well as the conditions during the course of settlement, explains 76.0 per cent of the variation in public acceptance times. Those results imply that the assessment of public acceptance times can be enhanced considerably if conditions during the settlement process are taken into account and monitored carefully.

The F-ratio, a test on the joint statistical significance of all the co-efficients, shows that the null hypotheses of no relationship between public acceptance times and the explanatory variables can be rejected for both models. These results suggest that both models are statistically significant and can be used in the assessment of settlement times.

The responses of both promoters and regional communities to the development of energy projects appear to be critical in the determination of settlement times. These responses will be conditioned, importantly, by expectations about the distribution of costs and benefits involved in the implementation of power facilities. The distribution of costs and benefits will be determined by the economic and political structure of the regional community and the need for both power companies and the national government to install new capacity to meet expected electricity demand increases.

In the predictive model, prefectural per capita income appears overall to be associated negatively with settlement times. This result does not support the hypothesis that, in general, settlement times are likely to be longer in prefectures where there are relatively high levels of per capita income. Nuclear plants are usually located in low income areas while fossil-fuelled plants are located, generally, in relatively high income areas close to major electricity consumption centres. It is therefore necessary to consider nuclear and fossil-fuelled plants separately in order to understand the relationship between income levels and public acceptance times.

A separate consideration of nuclear and fossil-fuelled plants suggests that the importance placed upon social and physical environmental impairment appears to be higher in the case of fossil-fuelled relative to nuclear facilities. Fossil-fuelled projects are located in high income areas which already display relatively high levels of pollution. Communities in those areas will, therefore, be less enthusiastic about accepting fossil-fuelled projects which will add to existing levels of pollution. As incomes are relatively high in these areas, the communities will place less weight on income expansion expected to arise out of the construction of a fossil-fuelled project.

The rate of change of prefectural per capita income during the settlement process is negatively associated with public acceptance time. In the evaluative model, the level of per capita income at the time of a decision to locate a project is statistically insignificant. This suggests that expectations about future income growth during the negotiating process appear to be a more important determinant of settlement times than expectations about those opportunities at the commencement of the settlement process. In prefectures where incomes are growing rapidly, communities are likely to give more attention to the benefits arising out of that growth; they may wish to see a further expansion of that growth. Under these circumstances, there may be a lag in anticipating the adverse effects of project development. Consequently, they may be more easily persuaded to accept energy projects.

The ratio of tax revenues from regional sources to expenditure on public goods by regional government or the local financial index of the city, town or village at the time when it is asked to accept an energy project is associated negatively with public acceptance times. This relationship does not support the hypothesis that public acceptance times are longer in situations where the ability of local government to supply public goods and services is relatively high. The local financial index variable does not appear to capture some important effects of the development of initial energy projects on the financial autonomy of local government. One of the benefits of accepting energy projects is the increase in local government tax bases. A major part of the financial benefits are used to develop social overhead capital such as roads and hospitals. These financial benefits tend to decline after the construction of initial projects has been completed. The effect of the local financial index appears to be stronger in the case of subsequent packages relative to initial packages. Public acceptance times are likely to be shorter in the case of subsequent packages because of difficulties expected by local government in maintaining levels of expanded public expenditure. Local governments are likely to attach a relatively high weight to the benefits of continuing to fulfill community expectations for the provision of public goods and less to the environmental costs associated with additional projects.

The relationship between the ratio of primary product per capita to total product per capita and public acceptance times is positive, but not statistically significant. Primary sector opposition does appear, however, to be stronger in lengthening settlement times in the case of nuclear relative to fossil-fuelled plants. There appears to be more concern amongst the rural sector at the prefectural level about the risks of adverse effects from nuclear energy on the productive capacity of that sector. A nuclear accident and the discharge of radioactive substances is perceived by the rural sector to have widespread effects on primary industry within the prefecture. The environmental effects of fossil-fuelled projects are likely to give rise to less concern amongst the prefectural rural community as the impact of pollutants discharged is likely to be expected to be more localised and temporary.

The relative importance of employment opportunities in the rural sector is associated positively with public acceptance times, but not a significant factor influencing the variation in those times. Employment opportunities in the rural sector do, however, appear to be more important in lengthening settlement times in the case of subsequent packages relative to initial packages. The rural sector appears to be initially fearful of the development of power plants. These results suggest that primary producers become more fearful of the continued development of energy projects. They appear to be concerned that the construction of subsequent packages at any one site will cause further environmental degradation to factors of production, such as land, and will increase the risks of accidents.

The proportion of JSP and JCP seats in prefectural assemblies is associated positively with the degree of community difficulty in offering energy sites. Leftist political parties will place more emphasis on protection of the environment and, therefore, will offer more resistance to energy projects in situations where leftist party representation is relatively strong in prefectural assemblies. As expected, the importance of the leftist political party influence appears stronger in lengthening public acceptance in the case of nuclear compared to fossil-fuelled power plants. The JSP and JCP is likely to attach more weight to the risks of nuclear plants relative to the broad environmental costs of fossil-fuelled energy projects. Leftist political parties are likely to oppose more strongly the development of nuclear projects. Consequently, negotiating public acceptance for nuclear plants will be more difficult in prefectures with strong JSP and JCP representation in prefectural assemblies.

The time period in which settlements were negotiated is positively associated with public acceptance times. This supports the hypothesis that changes in local community attitudes after 1969 to placing a stronger emphasis on environmental quality appears to be associated with the lengthening of settlement times. The effect of the transformation in such attitudes seems to have been less important in lengthening approval times for subsequent packages. Although accidents and pollution problems emerged at several sites, the community tended to become more familiar with the risks involved in having power stations operating in their vicinity. Consequently, there appears to be relatively less resistance to accepting subsequent packages in areas where there is already at least one plant operating.

As expected, settlement times are likely to be shorter in situations where both private power companies and the national government expect forecast electricity shortages to be relatively large. Expected electricity supply shortages during the settlement process are more important in determining public acceptance times than expectations about those shortages at the time of a decision to locate a project in a particular region. The effects of expected electricity shortages in national government electricity spheres apears to vary between initial and subsequent packages. The national government appears to attempt to reduce settlement times for initial site pools in situations where capacity shortages are expected to occur. This suggests that the national government takes a longer term view of site management when electricity shortfalls are expected. The government seems to give more emphasis to the longer term benefits of the development of initial sites on which subsequent packages can be installed if necessary. It places less priority to the relatively higher set-up costs, such as infrastructure development, for initial projects.

The responses of both project promoters and regional communities are important in the determination of the times required to reach settlements over the development of energy power plants. The pattern of support for and resistance to energy project siting appears to have a reasonable degree of predictability. The models developed in this chapter explain a relatively large proportion of the variation in public acceptance times and are useful in the assessment of why the development of some projects take longer than others.

Applications and qualifications

The discussion above suggests that the distribution of benefits and costs from project development affects the ease or difficulty in siting energy projects. A necessary step in the analysis is testing the models developed for their predictive and explanatory power, specifying the assumptions upon which those models are based and detailing the qualifications which need to be made to their use in the analysis of the factors influencing the variations in settlement times.

An application to unlicensed nuclear plants

One method of testing the degree to which the models developed in the chapter are useful in the assessment of public acceptance times is to estimate settlement times for plants which had not received Denchōshin approval during the period of analysis. There are a number of nuclear plants which fall into this category and, therefore, were excluded from the regression analysis.[17] These observations can be used to test the general applicability of the models in the assessment of settlement times.

The test consists of an examination of the residuals between arbitrary public acceptance times and those times estimated from the models. Arbitrary public acceptance time is defined as the time from when a decision is made by a power company to locate a nuclear plant in a particular year to 1979, the cut-off point for the regression analysis.[18] Predicted times are calculated by using the estimated co-efficients of the models and the relevant values of the explanatory variables in those cases.

----

17. Inclusion of these observations into the analysis would distort the results as they can only be given arbitrary as opposed to actual public acceptance times. The regression, therefore, makes the assumption that all projects in Japan have received Denchōshin approval, and does not include or take into account many projects which have been substantially delayed or abandoned. The development of a model for assessing settlement times requires that consideration be given to those cases. An appropriate way of doing this is to use the model developed in this chapter to make assessments of the public acceptance times for those projects.

18. Or, as in some cases, the time when the project was officially abandoned.

The applicability of the models can be assessed by considering the magnitude and sign of the residual. A model can be said to be assessing public acceptance times relatively well if the residual is large and negative. This would imply that the settlement process would be reached at a time substantially later than 1979. Considerable over-estimation of public acceptance times for unlicensed plants would suggest that the models could have been used in making some assessments of the times for those plants. On the other hand, the models can be said to be not capturing important influences affecting settlement times if the residual is positive or arbitrary public acceptance times are greater than predicted times.

Table 4.4 presents the results of arbitrary public acceptance times and estimated times for nuclear power plants which had not received Denchōshin approval by 1979 for both the predictive and evaluative models. The results support the thrust of the argument in the preceding section. The predictive model appears to under-estimate substantially arbitrary public acceptance times. The evaluative model which takes into account changed conditions during the settlement process, also appears to under-estimate public acceptance times but to a lesser extent and, therefore, would have been relatively more useful in making some assessments of public acceptance times.

The residuals derived from the predictive model are, in general, positive and relatively large. While the residual for Hikigawa is -10 months, the magnitude is relatively small. These results suggest that the predictive model is

TABLE 4.4

ASSESSING PUBLIC ACCEPTANCE TIMES FOR UNLICENSED NUCLEAR POWER PLANTS [a]

Plant Name	Period	Arbitrary PAT [b]	Predictive Model		Evaluative Model	
			Predicted	Residual	Explained	Residual
Shimokita	1965-1979	159	61	98	100	59
Namie	1967-1979	140	81	59	99	41
Noto	1967-1979	140	34	106	107	33
Kumano	1967-1979	140	11	129	126	14
Ashihama	1963-1979	179	14	165	87	92
Suzu	1975-1979	45	13	32	147	-102
Hidaka	1967-1979	141	35	106	96	45
Koza	1967-1979	140	35	105	96	44
Nachi-Katsura	1969-1979	110	25	85	103	7
Hikigawa	1976-1979	30	40	-10	154	-124

Notes: a. Public acceptance times are measured in months.

b. Arbitrary public acceptance times are calculated using 1979 as a cut-off year. This is consistent with the regression analysis.

not capturing some of the major factors that influence the variation in settlement times. The calculated residuals from the evaluative model are also in general, positive but their magnitude is relatively smaller. This provides evidence to the effect that monitoring conditions during the negotiating process is critical in assessing accurately the times required to win approval for the development of energy projects. These results suggest that the evaluative model appears to capture a larger proportion of the major factors influencing public acceptance times compared with the predictive model.

Qualifications

The analysis to date has identified a number of statistically significant variables which will be of use in the assessment of settlement times. The residual OI^{sd} identified in 4.1, which is a summary measure of the importance of other factors not captured in quantative analysis, is still large.[19] This conclusion was confirmed when applying the models to unlicensed nuclear power plants. As expected, other factors, such as uncertainty, changed expectations, the allocation and use of bargaining power and the effectiveness with which bargaining strategies are employed, will also influence settlement times. The residual provides a starting point for the analysis of the importance of these factors which need to be qualified in

----

19. The analysis also provides a measure of the importance of such factors in explaining why specific projects took in shorter or longer time to reach a settlement compared with other projects.

providing a more comprehensive framework for the examination of the variation in settlement times and in developing generalisations which will enhance the predictability of settlement times based solely on quantitative models.

Before discussing those factors in more detail in the case studies, it is necessary to briefly review them in the context of the assumptions of the regression model. The major assumption of the quantitative models is that the operation of compensation mechanisms in economic and political bargaining over an acceptable distribution of cost and benefits expected from project development is the same in all situations. While the effectiveness of compensation mechanisms will depend on how they are tuned to the structure of the distribution of costs and benefits, other factors, such as changing expectations and uncertainty, may affect settlement times in a way which can not easily be understood from the foregoing analysis of influences on settlement times.

As noted in the previous section, the evaluative model compared with the predictive model, takes into account more fully the impact of expectations formed during the settlement process as an influence on the outcomes of those processes. It does, however, presume that expectations, while potentially different from those prior to the settlement process are changing constantly.[20] The expected

----

20. The formula for calculating the trend rate of growth is contained in footnote 6 of this chapter, and assumes a exponential rate of growth during the relevant time peri

costs and benefits of projects may, for whatever reason, fluctuate during the settlement process and this may lead to revised expectations. Such changes are likely to influence settlement processes in a way which is not taken into account adequately by the assumption of constantly changing cost-benefit ratios.

The analysis presumes that costs and benefits are known with certainty and, therefore, there is perfect information about the value of energy projects. Uncertainty about the benefits and costs of projects is likely to alter cost-benefit calculations. For example, project promoters may not be willing to negotiate compensation arrangements with regional interests in situations where they are uncertain about future electricity demand increases and project costs are increasing. The degree of riskiness attached to project development is, therefore, likely to have an impact on the settlement processes between promoters and regional communities over the development of energy projects.

In the analysis to date, it has also been assumed that the rural sector is internally homogeneous. The variable which considers the rural sector response implies that the distribution of benefits and cost is evenly spread amongst different rural interest groups and that those impacts are the same in all situations. Rural interests groups may not be internally homogeneous and, therefore, the extent to which compensation mechanisms take into account an uneven spread of costs and benefits amongst such regional interests is likely to influence the settlement process.

The distribution of benefits and costs, even if revised expectations, uncertainty and the spread of those benefits and costs are taken into account, may not be the only major influence affecting settlement times. The allocation of economic and political bargaining power between and amongst regional interests and promoters and the skill with which bargaining strategies are employed is treated as similiar in the model for all cases. These political influences are likely to influence the time necessary to reach settlements in a way which is not represented fully in the quantitative model developed for analysing the impact of distributional influences on settlement times.

Selected case studies

The development of generalisations about the nature and importance of influences affecting the residual will be important in providing better assessments of public acceptance times than would be obtained by simply relying on quantitative models. An analysis of the residuals for a number of selected observations will be useful in developing generalisations about the nature and relative importance of these other influences in facilitating or impeding the settlement process.

Table 4.5 presents the observations which have been selected for detailed case study analyses. It shows public acceptance times projected by power companies and times estimated from the models developed in this chapter. The residuals for company assessments as compared to those for the predictive and evaluative models provide useful

TABLE 4.5

SELECTED OBSERVATIONS FOR CASE STUDY ANALYSES

Plant Name	Period	Actual PAT[a]	Company Assessment[b]		Predictive Model		Evaluative Model	
			Projected	Residual	Predicted	Residual	Evaluated	Residual
Ashihama[c]	1963-1979	179	25	154	14	165	87	92
Hamaoka	1967-1969	23	6	17	24	-1	15	8
Matsushima	1973-1976	44	20	24	68	-24	68	-24
Tomari	1969-1982	156	40	116	110	46	131	25

Notes:

a. Public acceptance times and residuals are measured in months.

b. These figures were derived from newspaper articles which reported the relevant power company's first public statement on the timing of the submission of the proposal for Denchōshin approval. These estimates were reconfirmed by personnel in respective power companies.

c. As at 1979, the Ashihama and Tomari nuclear projects had not obtained Denchōshin approval.

references for the case study analyses. Company assessments have, in all the cases, under-estimated the time necessary to obtain community approval for the development of energy projects. The predictive model, while generally under-estimating public acceptance times, appears to be capable of assessing the times equally well or better than power company assessments. The evaluative model also generally under-estimates settlement times to a lesser extent and, therefore, provides better estimates than both company assessments and the predictive model.

A convenient starting point for the case study analyses is an examination of the Ashihama nuclear power plant which was abandoned by Chubu Electric in 1967. The planned location for this plant was on the border of Kisei and Nanto towns in Mie Prefecture. Ashihama was the first commercial nuclear plant scheduled in Japan; it was also the first nuclear plant which confronted substantial siting difficulties and was ultimately abandoned. Chubu Electric assessed that public acceptance for the project would take 25 months and this represented an under-estimation of 154 months. The magnitude of the residual in the predictive and evaluative models is 165 months and 92 months respectively. Ashihama represents an outlier case in both the predictive and evaluative models, and there is a substantial interest in exploring the reasons why the project was so substantially delayed and ultimately abandoned.

This case study examines the influence that powerful economic and political regional interest groups can have on delaying the settlement process. Regional interest groups, who are adversely affected by a particular project development, if effectively mobilised, can gain access to decision-making centres. This access allows those interests to impede bargaining processes even if promoters place a relatively high value on the development of energy projects. A careful analysis of the nature and structure of regional interests groups, is important in assessing whether settlement times for particular projects will take shorter or longer than average times.

As a result of continued difficulties at Ashihama, Chubu Electric decided to attempt to place its first nuclear power plant in Hamaoka town in Shizuoka Prefecture. Community approval at Hamaoka took 23 months and this was among the fastest public acceptance time for a nuclear power plant in Japan. Chubu Electric under-estimated the time to submit the project to Denchōshin by 17 months. The company assessment in this case was, however, substantially better than in the earlier Ashihama case. The predictive model appears to predict the settlement time relatively well. The residual for the evaluative model is -9 months and appears to over-estimate public acceptance time a little.

The Hamaoka case study explores the importance of the social value of projects in the siting of energy plants. Promoters, such as regional governments and project developers, who place a high priority on the installation of projects can act together in weakening ideological resistance and creating a bargaining environment in which promoters and regional interests can negotiate a settlement.

The provision of reliable assessments as to whether public acceptance times at particular sites will be shorter than average times requires an analysis of the value that interests participant to the settlement place on the development of projects.

The third case history study details the settlement process involved in the siting of the Matsushima coal plant by the Electric Power Development Company (EPDC) from 1973-1976. This plant, the first coal plant which used imported coal, developed after the 1973 oil crisis, is located on a small island called Matsushima off Ooseto town in Nagasaki Prefecture. The EPDC under-estimated the time to reach a settlement by 24 months. The predictive and evaluative models, in contrast, both over-estimate the time to win community approval by 24 months.

The Matsushima case study focusses on the impact that the national government, in pursuit of energy policy objectives, can have on regional settlement processes. Changes in energy policy, which stress economic security and regional electricity sharing can allow a national government to intervene in regional political processes, thus facilitating a settlement. A national government can do this by providing subsidies to develop the project and acting as a mediator between conflicting and uncompromising interests. An important factor in the assessment of settlement times is monitoring energy policy priorities and changes in those priorities at both the national and regional levels and considering the willingness of national government to intervene in regional settlement processes.

The final case study considers the siting of the Kyowa-Tomari nuclear power plant. This plant, which is presently under construction, is located in Tomari village in Hokkaido. Hokkaido Electric assessed that the settlement time would take approximately 40 months. While that assessment was out by 116 months, the residuals for the predictive and explanatory models are 46 months and 25 months respectively. The siting models appear to be capable of assessing more accurately than Hokkaido Electric the time needed to win agreement over the installation of the project.

This study stresses the importance of high economic costs as a determinant of a promoters lack of willingness to negotiate a settlement over the development of a project. High economic costs can occur as a result of uncertainty about expected electricity demands increases and the increased risk about the reliability of regional electricity grids associated with the installation of large projects. Promoters confronted by high economic costs in the development of projects are not likely to be willing to negotiate rapid settlements with regional communities They may intentionally delay costly projects and develop alternative projects with shorter leadtimes and smaller costs. It is important to consider the economic costs of projects when assessing why some projects take shorter or longer than average times to develop.

Distributional influences and project delay

Expectations about the distribution of costs and benefits of energy power plants appear to be crucial in the determination of public acceptance times. The social and economic conditions which are likely to influence promoter and community responses to energy power plants shape the bargaining environment in which settlements are negotiated. The bargaining environment acts as a strong positive or negative catalyst in the settlement process.

Quantitative models are useful in providing a measure of the importance of the distribution of costs and benefits on the variation in settlement times. They suggest that it is possible to quantify important influences and develop generalisations about the impact of those influences on the speed at which settlements can be reached. Predictive models which use information about expectations prior to the commencement of the settlement process provide some predictability in settlement times. Changed expectations during the settlement process also influence promoter and regional community responses toward the development of energy projects. The assessment of public acceptance times, therefore, requires monitoring carefully social and economic conditions that emerge during the negotiating process.

The structure of the regional political economy and of power company and national government electricity supply-demand forecasts appear s to be critical determinants of the variation in approval times. Evidence was presented to support five major hypotheses. First, settlement times are likely to be shorter in situations where expectations for continued income expansion are strong. Second, community approval seems to be more difficult in time periods where social attitudes place a relatively high emphasis on protection of the environment. Third, settlements tend to be won more quickly in periods where promoters expect electricity shortages to occur. Fourth, public acceptance appears to be negotiated more easily for subsequent packages because the local economy becomes dependent on continued construction for the provision of public goods and because of more familiarity with the risks involved in the operation of power plants. The rural sector, however, acts to impede the settlement process for subsequent packages. Fifth, approval for nuclear projects appears to be more difficult in prefectures where there is a relatively large rural sector and strong leftist party representation in prefectural assemblies. This resistance to nuclear projects is offset by community support for nuclear projects in prefectures where there are strong expectations for economic development.

These factors are useful in predicting and explaining a large proportion of the variation in settlement times. However, the residual is large enough to warrant additional analysis of factors, such as: uncertainty, the allocation and use of political power and changed expectations, which are not capable of being captured in general quantitative analysis, yet will influence the speed at which settlements can be reached. It is necessary to examine these influences and try to develop generalisations as to why certain cases have taken longer or shorter than average public acceptance times to implement. Such an analysis will enable more accurate assessments of settlement times to be made.

Chapters 5 to 8 attempt to develop broad generalisations about the relative impact of these other influences which are likely to be important in making assessments of the relative ease or difficulty in locating energy power plants.

5

THE EFFECT OF ECONOMIC AND POLITICAL INTEREST GROUPS

The nature and structure of interest groups and their responses to projects is likely to be a critical element in assessing the speed at which approval is given for the development of energy projects. Project promoters generally face intense opposition where projects are likely to have large adverse effects on regional interests, such as property right owners, who have or can acquire political access to decision making. In those situations, promoters, even if they place a relatively high value on project installation, are not likely to be capable of adequately compensating regional interests in order to strike a settlement. Consequently, projects are likely to be delayed and may sometimes be abandoned.

The Chubu Electric Power Company attempted to locate the Ashihama nuclear power plant on the border of Nanto and Kisei towns in 1963. Project implementation was delayed by local property right owners in Nanto and factional interests within the Liberal Democratic Party (LDP) in Kisei and was ultimately abandoned in 1967. It was one of the first nuclear projects for which planning was commenced in Japan. At the same time, it was the first project that was abandoned because of intense resistance by powerful local interest groups.

The power company estimates and the statistical models developed in the previous chapter would have provided an unreliable basis from which to assess the settlement time at

Ashihama. Chubu Electric had predicted that it would take 25 months to reach an agreement with the electorate at Ashihama. The predictive and evaluative models developed in the previous chapter estimate that agreement would have taken 14 and 87 months respectively. All these assessments, therefore, substantially under-estimate the time that the power company was required to spend trying to reach a settlement at Ashihama. More important, the assessments do not reveal any indication that the project would ultimately be abandoned.

The statistical models suggest that the expected distribution of costs and benefits were structured in a way which would have facilitated a relatively quick settlement at Ashihama. Chubu Electric faced relatively large electricity shortages between 1963 and 1969 and the company wished to develop a nuclear plant quickly. In the Central Electricity Sphere, the national government experienced declining electricity shortages and, therefore, did not place a high social and economic value on the rapid implementation of the project.[1] Incomes in Mie prefecture were growing very quickly and the community wished to develop a project to further expand that growth. Community attitudes placed relatively little emphasis on the social and physical environmental degradation that was expected to accrue as a result of the project development.

The models which take into account these factors do not adequately explain the actual time that Chubu Electric spent

----

1. See Chapter 4 for a fuller analysis of the relationship between these factors and public acceptance times.

trying to persuade the Mie electorate to accept the project; nor do they explain why the power company withdrew its plan to site a nuclear power plant at Ashihama. The statistical analysis fails to adequately account for the structure and representation of interests groups who were opposing the project. The structure of interests, as measured through the quantitative analysis, may not coincide with representation of those interests and, therefore, the effectiveness with which interest groups are represented and other aspects of their structure has to be considered in explaining actual settlement times. The provision of reliable assessments of public acceptance times requires fuller analysis of the structure and representation of interest groups and the way they respond to the development of energy projects.

Chubu Electric faced considerable resistance to the Ashihama project by local fishing cooperatives in Nanto town. The local fishing industry was experiencing a boom in activity and expected to incur large losses as a result of the development of the project. The structure of the pearl industry, which required specialisation in the production process, facilitated the formation of an alliance amongst fishing interests and they were able to acquire strong representation in the local assembly. The power company was not willing to compensate these fishing interests adequately and prefectural and national government pressure was unsuccessful in weakening their opposition to the plant. The power company in response to local opposition attempted to change the location of the plant to an area solely within

Kisei town. Factions within the Kisei LDP were competing over the acquisition of political power and took diametrically opposed positions on the project. Chubu Electric did not structure its compensation policy to take into account the structure of local factional conflict. This conflict culminated in a recall movement which ousted the incumbent faction from power and the company was forced to abandon the project in 1967.

Mobilising support for the project

The Chubu Electric Power Company approached the Mie government in late 1963 about a proposal to locate a nuclear power plant.[2] Although there was no urgency to develop the project to balance electricity supply and demand, the power company wished to commence preparations in order to obtain subsidies from the national government. The prefecture responded quickly and within a month had won agreement from local mayors in Nanto and Kisei towns to accept the project.

Inducing competition

On 15 November 1963, the Chubu Electric Power Company approached the Mie prefectural government and discussed a proposal to locate a nuclear plant in that prefecture. The governor, government and, in particular, Tanaka Satoshi, then governor, were very eager to accept one of Japan's first commercial nuclear power plants. Mie prefecture had

----

2. See Appendix 3 for a chronology of events from 1963 when the power company decided to locate the project at Ashihama to 1967 when it was forced to give up its plans to locate the project.

been left behind neighbouring prefectures in economic development. Tanaka, previously an official of the Ministry of Finance, had a strong development ethos and believed that the construction of a nuclear power plant was essential for Mie's economic development, especially as a source of power supply to other neighbouring prefectures.[3]

During the post-war period, Mie had been left behind neighbouring areas, such as Kanagawa prefecture and Tokyo, but in the late 1950s entered a period of relatively high economic growth which continued into the early sixties. During the period from early 1963 to 1967 the average annual rate of growth was 20.0 per cent and this was substantially higher than the average of 12.7 per cent at other regions which accepted energy projects.[4] Within the community there was a strong desire for continued growth in economic activity and there was a high demand for the development of projects, such as energy plants.[5]

Energy plants were a particularly attractive proposition because of Mie's proximity to the major consuming regions of Tokyo and Kanagawa prefectures. With high economic growth in both Tokyo and Kanagawa, electricity demand had started

----

3. See Nakamura K., et al., **Genpatsu: kumano gyōmin kaisenki**, [Nuclear Power: The Sea Battle at Kumano], Gijutsu to ningen, Tokyo, 1982, pp.10-18.

4. Calculated from Sōrifu tōkei kyoku, **Nihon tōkei nenkan** [Japan Statistical Yearbook] Nihon tōkei kyōkai and Mainichi shinbun sha, Tokyo, various issues, 1963-1967.

5. Information received in an interview with officials from the Ministry of Finance (MOF), Tokyo, 1983.

to outstrip supply capacity.[6] Not only was the market attractive but Tanaka also felt that he could enhance Mie's status with neighbouring prefectures by developing a nuclear project which could supply electricity to them.[7]

Tanaka ordered officials to investigate the Kumano region in the southern part of the prefecture. This region consists of Nagashima city and Kaiyama, Nanto and Kisei towns and was economically underdeveloped compared with the rest of the prefecture. It had been historically prone to typhoons which had on numerous occasions devastated the areas in the region. The consequent reconstruction efforts had led to financial difficulties and this had drawn resources away from the development of social and economic infrastructure necessary to facilitate economic growth and development.[8] The region had been a drain on the prefecture's financial resources, and Tanaka felt that the development of a nuclear

----

6. In 1963, Mie was approximately 90 per cent self-sufficient and the construction of the nuclear plant would have allowed the prefecture to export excess electricity, particularly to Tokyo, which was only 48 per cent self-sufficient in 1963. At that time, Kanagawa was 75 per cent self sufficient in the supply of electricity. See Nihon enerugii keizai kenkyujō, **Chiiki betsu energuii juyō tokusei no bunseki** [Characteristics of Energy Supply and Demand in Japan by Prefecture], Nihon enerugii keizai kenkyujō, Tokyo, 1980.

7. Information received from a consultant to the electric power industry, 1982.

8. Mie's financial index was relatively low at 0.66, and the prefecture was relying very heavily on outside finance from the national government to develop necessary regional infrastructure to facilitate economic development. Data compiled by the Ministry of International Trade and Industry (MITI), 1983.

plant in one of those areas would alleviate an important part of the financial burden on the prefecture.[9]

On 28 November, Tanaka held discussions with the mayors of Nagashima, Kaiyama, Nanto and Kisei about the feasibility of the proposal. He was interested in obtaining a quick settlement. The four mayors were, however, concerned about the safety of nuclear technology. It was decided that they should visit the Tokai nuclear plant so that they would be persuaded that peaceful uses of nuclear energy would cause no risk to the local community.[10] Tanaka, after convincing the mayors between 5 and 6 November on the safety of the project, persuaded them to consider the project within two weeks.

Tanaka's strategy was to induce competition amongst the four mayors so that a suitable location could be identified and selected quickly. There emerged considerable resistance from fishermen in Kaiyama town and this was expected to prevent the town from issuing an investigation permit to Chubu Electric. It also became clear that there was no suitable location in Nagashima city as there was a relatively high population density in that city. In contrast, the mayor of Kisei town, Yoshida Tamenari, and the Mayor of Nanto town,

----

9. In 1959, the Ise typhoon devastated, extensively, 89 public facilities and caused damage worth approximately 218 million yen. In 1960 and 1962, a tidal wave and typhoon Number 14 cost the region approximately 90 million yen in reconstruction. Information obtained from data provided by the Chubu Electric Power Company, 1982.

10. See Chapter 6 for a fuller analysis of the impact of this strategy in reducing concern about the risk of nuclear technology.

Nomura Junnosuke, adopted positive attitudes toward the development of the nuclear project.[11] By the middle of November, the Ashihama site, which bordered Nanto and Kisei towns had been selected and the mayors agreed that they would issue an investigation permit on 13 December 1963.

The Ashihama site is located in a desolate area overlapping the boundaries of Nanto and Kisei towns. Map 5.1 illustrates the location of the site and the structure of property right ownership. The productive capacity of the land was very low and the area was one of the few areas in the locality not suitable for the production of agricultural crops. Both Yoshida and Nomura wished to put the land to good use. Both towns had been experiencing an outflow of population and were relying heavily on external finances for the development of social and economic infrastructure. In 1963, the financial index for Kisei and Nanto was 0.25 and 0.32 respectively.[12] Yoshida and Nomura felt that the development of a nuclear project and the consequent employment and tax benefits would reduce the outflow of population and enable the region to become financially independent.

Electricity supply-demand projections

On 1 December, the Chubu Electric Power Company announced that it wished to commence construction of the Ashihama

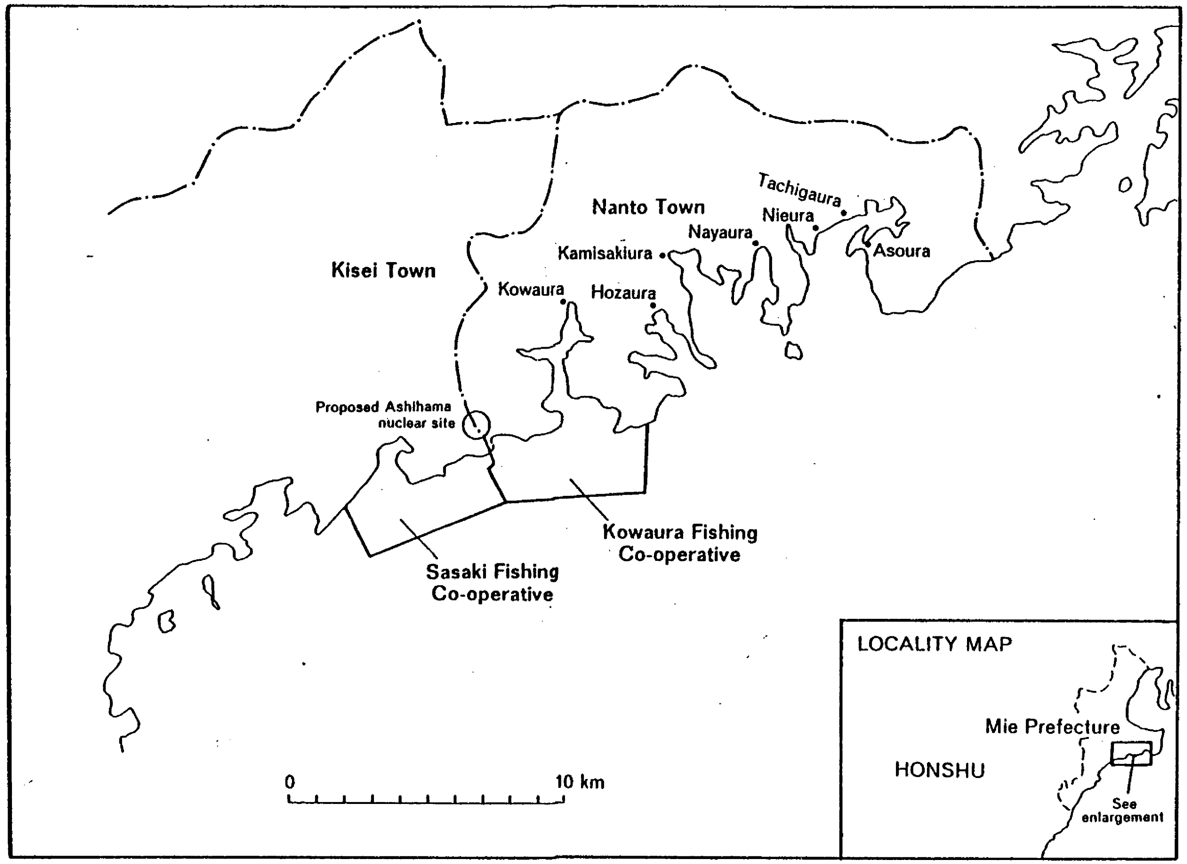
----

11. See Nakamura K., **op.cit.**, p.20.

12. See Jichi shō zaisei kyoku shidō ka, **Shichōson betsu kessan jōkyō shirabe** [An Examination of Local Financial Accounts], Jichi shō zaisei kyoku shidō ka, Tokyo, 1964.

MAP 5.1

LOCATION OF ASHIHAMA PROJECT AND STRUCTURE OF PROPERTY RIGHT OWNERSHIP



plant by 1966 and to start supplying power to the grid in 1970, thereby setting a seven year deadline to develop the project. Company planning allowed approximately two years to reach agreement over the construction of the plant, and a year to license the plant before commencing construction.[13] The planning horizon for reaching an agreement with the local electorate was directly related to Chubu Electric's expected electricity supply and demand situation.

The Ashihama plant was not in the Company's 1963 five year electricity supply-demand projections.[14] In 1963, Chubu Electric experienced a relatively low excess capacity ratio of 4.2 per cent. In the same year forecast demand for 1968 increased to 6290 Megawatts (MW) an increase of 13.1 per cent on forecast demand from the previous year. Despite this increase in expected demand, supply capacity had increased to 4122 MW, up 19.3 per cent from the previous year. In addition, there was 2720 MW of capacity in the licensing and construction stages, resulting in an expected five year supply surplus of approximately 552 MW.[15]

The power company thus had sufficient capacity to meet five year expected demand increases, and there appeared, in 1963, to be no strong electricity supply-demand justification for

----

13. Information received from the Chubu Electric Power Company, 1982.

14. See Chubu Electric's construction plan for 1963.

15. Data compiled by the Tokyo Electric Power Company, and Shigen enerugii chō kōeki jigyō bu, **Dengen kaihatsu no gaiyō: sono keikaku to kiso shiryō** [An Outline of Power Plant Development in Japan: Plans and Basic Data], Tokyo, various issues, 1967-1969.

rapid implementation of the project. There was, however, an incentive to commence planning for a nuclear power plant. In the early 1960s, Japan entered a nuclear energy boom and there was a strong incentive amongst power companies to compete for national government subsidies for the development of nuclear energy.[16] This incentive was particularly strong in the case of Chubu Electric, historically the third largest power company in Japan after the giant Tokyo and Kansai Electric Power Companies. The management of the Chubu Electric wished to secure a larger part of those subsidies which had traditionally gone to Tokyo and Kansai Electric Power Companies. This required showing the national government that planning for the Ashihama plant had commenced.[17]

Economic resistance and access to political power

Chubu Electric commenced drilling investigations at Ashihama on 6 January 1964. The company's plans now sparked a response from the local fishing industry in Nanto. Fishing co-operatives in the town argued that there would be adverse effects from the project on the local fishing industry. Subsequently, they formed an alliance to oppose the project

----

16. Sato H., **The Politics of Technology Importation in Japan: The Case of Atomic Power Reactors.** Paper delivered to SSRC Workshop at Kona, Hawaii, September 1978, pp.33-35. See also Nihon genshiryoku sangyō kaigi, **Genshiryoku kaihatsu 10-nenshi** [A Ten Year History of Nuclear Power in Japan], Vols. 1 and 2, Nihon genshiryoku sangyō kaigi, Tokyo, 1965 for a more detailed analysisof the history ofthe nuclearpower industry in Japan.

17. Interviews with officials from MITI, and personnel from the Chubu Electric Power Company, 1982.

development collectively. They exerted pressure on the prefectural government and persuaded local farmers to oppose the plant. By August 1964, they had successfully gained electoral access to the local assembly. This direct access to local political power placed them in a very strong position to impede project implementation.

Alliance formation

Between 7 and 9 March the Kowaura Fishing Co-operative, the motivating force behind the emergence of opposition, established the **Genpatsu hantai kyōtō iinkai** [Fisherman's Struggle Committee for Opposing Nuclear Energy]. The Kowaura Fishing Co-operative was the closest co-operative to the proposed site.[18] They were particularly concerned about the impact of the project on the marine environment given their proximity to waste water outlet pipes which would discharge waste water into the ocean. After discussing the effects of the project with the Mie Prefectural Fishing Co-operative, the members of the Kowaura Fishing Co-operative decided to oppose the project.

The Fisherman's Struggle Committee appealed to other fishing co-operatives in Nanto town to oppose the project jointly. This was successful. On 16 March, the Kowaura and other six co-operatives in Nanto town, Asoura, Tachigaura, Nieura, Kamisaki, Naya and Hozu Co-operatives, formed the **Genpatsu hantai gyōgyōsha kyōtō chuō iinkai** [Central Fishing Struggle Committee for Opposing Nuclear Energy; hereafter Central

----

18. See Map 5.1.

Committee]. In the short period between January and March 1964, the local fishing industry had established an alliance which was to form the basis of resistance to the placement of the Ashihama nuclear power plant.

The formation of the alliance resulted from fears about the effects of the project on the fishing industry and the economic and historical relationships between fishing co-operatives in Nanto. Nanto town was built upon the fishing industry. Yellowtail fishing had been important there from before the Pacific war. By the late 1950s, climatic changes had led to a high incidence of typhoons, and this had substantially reduced the catch of yellowtail. The fishing industry, however, shifted its efforts to pearl cultivation. The existence of a rias coastline with several calm and shallow water inlets provided a suitable natural environment for the cultivation of pearls.[19] In the early 1960s, there was a pearl boom in Nanto and the value of pearl production had increased to 3000 million yen per year.[20] A majority of the households in Nanto employed in

----

19. Interview with consultant to the electric power industry, 1983.

20. Nakamura K., **op.cit.**, p.23. Nakamura's book provides a detailed discussion of the resistance by Nanto Fishing Co-operatives to the siting of the Ashihama nuclear power plant. It is the only major published work on the dispute. Nakamura was a member of the Kowaura Fishing Co-operative and was involved in the opposition movement. His analysis focuses on the events in Nanto and he argues that resistance by Central Committee was the critical element forcing the abandonment of the project. This chapter draws on Nakamura's work in considering opposition by fishing interests in Nanto, but extends his analysis by considering the impact of factional conflict between political interest groups in Kisei on the settlement process.

the fishing industry were engaged in the production of pearls.[21] There was substantial concern about the economic impact of waste water, on the local fishing industry. The fishing sector argued that the effects of temperature changes in the marine environment would affect stationary molluscs, such as pearls, more than fish, which are capable of migrating to other areas to escape temperature changes. They also argued that any adverse impact on pearl cultivation would have severe employment consequences.[22]
The structure of the fishing industry also facilitated the formation of the Central Committee which brought together the seven fishing co-operatives from Nanto. Pearl cultivation requires specialisation in the production process. There are three major steps in the process, which takes approximately three years. The first is cultivating a seedling which is attached to stationary nets. The second is growing an oyster shell. The third is inserting the seedling into the oyster. In Nanto town, the Naya Fishing Co-operative produced the seed pearl. The five fishing co-operatives from Kowaura to Tachigaura grew the oysters, and the Asoura Fishing Co-operative undertook the insertion process.[23] Given this industrial structure, any adverse impact on the Kowaura Fishing Co-operative would have

----

21. By 1965, there were 1400 households employed in the Nanto fishing industry. Of these householders 1350 were engaged in the production of pearls. Information received from the Ministry of Agriculture, Forestry and Fisheries (MAFF), 1983.

22. Information obtained from consultant to the power industry, 1983.

23. Nakamura K., **op.cit.**, pp.25-28.

affected, negatively, the entire local pearl industry. Established historical relationships between the fishing co-operatives in Nanto town were also an important factor in the formation of an alliance. There had been a long history of protecting their fishing grounds from attempts by other neighbouring fishermen to utilize those grounds. During the Tokugawa and Meiji periods, there were major conflicts between fishermen from Nanto and from Aichi prefecture over the right to fish in the waters off the Kumano coastline. Fishermen from Aichi prefecture would go periodically to the area and attempt to fish. Nanto fishermen would resist these incursions and several sea battles occurred. There was, thus, a strong consciousness of the need for collective defence against outsiders who were perceived to be damaging Nanto fishing interests.[24]

The structure of local interest groups, who expect to be adversely affected by energy projects, is a critical element in reaching settlements over the construction of energy power stations. In Nanto, the operation of the pearl industry, which required specialisation in the production process, meant that the project would affect the entire pearl industry and this facilitated the formation of a powerful alliance to oppose the Ashihama project. Chapter 6 considers the relative ease in reaching a settlement at Hamaoka where the effects of a nuclear project were not evenly distributed amongst local fishing interests. The promoters of the project were able to weaken the basis of an

----

24. Interview with personnel from the Chubu Electric Power Company, 1982.

alliance opposing the project by appealing to those interests who did not expect to be adversely affected.

Gaining access to political decision-making

A critical element in the Central Committee's opposition strategy was to have its concerns registered through political channels at both prefectural and local levels. On the prefectural level, the committee used established political connections to oppose the project in the assembly. On the local level, they won the support of farmers and used this additional power base to gain electoral access to the Nanto assembly. The Central Committee was, therefore, able to strike, directly and effectively, at the nerves of regional government.

On the prefectural level, the committee appealed to Satonaka Masahira who was speaker of the Prefectural Assembly and who had fishing connections in Nanto. Satonaka was born in Nanto and a major part of his electoral support originated in that town. He had promoted the development of the pearl industry in its early stages and in return the Nanto Fishing Co-operative supported him in elections. As Speaker of the Assembly, Satonaka was able to exert considerable influence on prefectural politics by shaping the nature of debate in the assembly. The Central Committee through its relationship with Satonaka had a critical entry point to the prefectural political arena and used his influence to have their concerns about the nuclear project voiced in the assembly.[25]

The Central Committee established its decision-making headquarters in the Mie Prefectural Fishing Co-operative. The Director of the Co-operative was Ishikawa Maruyoshi, who had been a LDP prefectural assemblyman and a member of the House of Representatives. Ishikawa had close connections with prefectural politicians and was able to exert pressure on the prefectural government. The continued success of the pearlindustry was important to the prefectural Fishing Co-operative. Ishikawa was also concerned that prefectural economic development policies were not adequately taking into account fishing interests. Backed by the Mie Prefecture Co-operative, he appealed to governor Tanaka to stop the project.[26]

Fishing interest groups in Nanto thus had direct access to decision-makingcentres at the prefectural level, and this appeared to have an immediate impact. On 13 April, 1964, Tanaka, while debating the nuclear issue in the prefectural assembly declared that the project would not be developed unless it could facilitate regional development and enhance the welfare of the regional community. This statement reflected the politicisation of the nuclear issue at the prefectural level. The proposed development of the Ashihama project had caused a split in the LDP between interests wishing to protect the fishing industry and those wanting to

----

25. Information received from consultant to the electric power industry, 1983.

26. Nishimura K., **op.cit.**, pp. 49-51.

accept the project. Tanaka was forced to modify his earlier attitude of strongly promoting the project. He adopted a more cautious stance on the project while leaving open, and postponing a decision on, the option of developing or not developing the project.[27]

The Central Committee also exerted pressure on the Nanto town assembly and, in particular, by recruiting to their cause assemblymen representing the farming sector. A strategy of appealing to farmers was critical to changing the assembly's neutral position on the project.[28] In Nanto, assemblymen represented fishing, farming and commercial interests. Historically, local politics had been dominated by farmers. In the post-war period, fishing had emerged as the major industry in Nanto and this led to the emergence of the fishing sector as a new political force in the affairs of the town. The agricultural sector, nonetheless despite a relative decline in economic power, still retained influence in local politics. The commercial sector, represented by mayor Nomura, had only minor representation in the local assembly.

The emergence of the fishing industry in the post-war period had led to conflict between fishing and agricultural

----

27. Information received from Chubu Electric Power Company, 1982 and a Diet member, 1983.

28. The information in this section on the Nanto farmer's response to the project and their role in the siting dispute was based on extensive interviews with the Chubu Electric Power Company and a consultant for the power industry in 1982 and 1983.

interests over the acquisition of political power and the distribution of spoils from local government. Nomura came to power in the late 1950s, at a time when this conflict was particularly intense, because of his ability to mediate between fishing and farming interests. During the initial stages of the conflict, farmers in Nanto had adopted a neutral position toward the project. The continued resistance by fishermen had the effect of changing their attitudes toward the development of the plant. Farmers in Nanto were persuaded that the nature and extent of benefits from the project were unclear. At the same time, they became concerned about the risk of nuclear energy and the potentially harmful effects on their agricultural produce. It was not farmer-fisherman calculation of the benefits and cost of the project that led farmers to adopt a position of opposing the nuclear plants.

The appeals of the fishing industry to the farming sector and local politicians representing that sector were successful. On 17 June, the town assembly decided to oppose the project. Nomura, despite the change in the town assembly, continued to promote the Ashihama nuclear plant. In response, the Central Committee together with the farming sector commenced a recall movement on 30 July, and Nomura was ousted as mayor of Nanto town. On 30 August, after discussions between fishing and farming interests, Yamamoto Tenzo, a farmer from Naya hamlet, came to power in a non-contested election. Although Yamamoto was a farmer, all the assemblymen in his cabinet were fishermen. Yamamato's selection represented a compromise between fishing and farming politicians in Nanto. The Central Committee felt that their ability to oppose the project would be weakened should the farmer-fisherman conflict, which historically had characterised local politics in Nanto, re-emerge in the context of deciding on a suitable mayor. This division of power resolved that conflict and, at the same time, closed political channels via Nomura which had been open to both Chubu Electric and the prefecture to influence local decision-making processes. The Central Committee, therefore, gained complete political control over the town assembly and were in a powerful position to oppose the project.

Political factionalism

On 27 July, soon after the Central Committee started the recall movement to oust Nomura, Chubu Electric consulted with Tanaka and formally decided on the Ashihama site. On the same day, the Kisei town assembly accepted the proposal. The economic incentive to accept the proposal was much stronger in Kisei town than in Nanto town, since unlike Nanto, Kisei had no major industry to sustain local development. Paradoxically, however it was precisely because the project was so appealing that it was delayed, as opposing factions in the local LDP squabbled over credit for the development.[29]

----

29. This section on political factionalism in Kisei was based on extensive interviews with and information gathered from the Chubu Electric Power Company, a consultant to the power industry and a Diet member.

Kisei had been formed in 1957 by an amalgamation of Sasaki town and Kashinozaki town. The Sasaki town economy was based on fishing, but on a much smaller scale than in Nanto town.[30] The major part of fishing income was derived from deep sea fishing which had developed in the 1950s. The development of the deep sea fishing industry with its need for larger boats, port facilities and processing facilities had left the Sasaki Fishing Co-operative with large debts. Since Sasaki was no more than a base for fishing operations conducted at some distance members of the fishing co-operative believed that the project would not adversely affect the fishing industry in Sasaki town. They also saw the sale of property rights and the payment of compensation as a means of getting money to keep pay off their debt.

Kashinozaki town, located in a mountainous area inland of Sasaki had even fewer reasons to object to the project. The major industry in the town was forestry, but this industry was not capable of sustaining local development. As a result, there was a severe lack of social and economic infrastructure, such as roads, a major problem for an area located in relatively mountainous terrain. The construction of the project was seen by the local electorate to be beneficial for promoting local development and the provision of necessary economic infrastructure to facilitate that development.

----

30. The value of the fishing industry in Kisei was approximately 300 million yen. Imformation received from MAFF, 1983.

Yoshida Tamenari, the mayor of Kisei was able to use these economic incentives to promote the Ashihama nuclear power plant. He was, however, constrained in his support for the project because of the existence of an opposition faction within the local LDP headed by Sakaguchi Yuzo, the Speaker in the Kisei town assembly. The conflict between Yoshida and Sakaguchi was not over the safety of the nuclear power plant; it was over the acquisition of political power within Kisei town. The Sakaguchi faction argued that Yoshida would be able to strengthen his power base in the town should the project go ahead. They felt that Yoshida would be able to continue justifying his position as mayor given the large economic benefits that would accrue from the development of the project. This factional conflict immobilised, to a certain extent, decision-making over the placement of the project.

The origins of the Yoshida and Sakaguchi factions lay in the period before the amalgamation of Kashinozaki and Sasaki into Kisei town, when in the early 1950s, the national government established a policy of local amalgamations to enhance the administrative efficiency of regional electorates. In 1953, Mie prefecture, in accordance with that policy, decided that Sasaki town would amalgamate with Nagashima town and that Kashinozaki town would amalgamate with Ouchiyama town. The rationale for this prefectural plan was that the former two areas were fishing areas while the latter two were forestry and farming areas.[31] The plan

----

31. Prefectural officials felt that the amalgamation of towns with similar industrial structures would enhance administrative efficiency of the newly formed towns.

was supported by the ruling Sakagachi faction, but opposed by the Yoshida faction. Map 5.2 illustrates the prefectural, Yoshida and the Sakaguchi amalgamation plans.

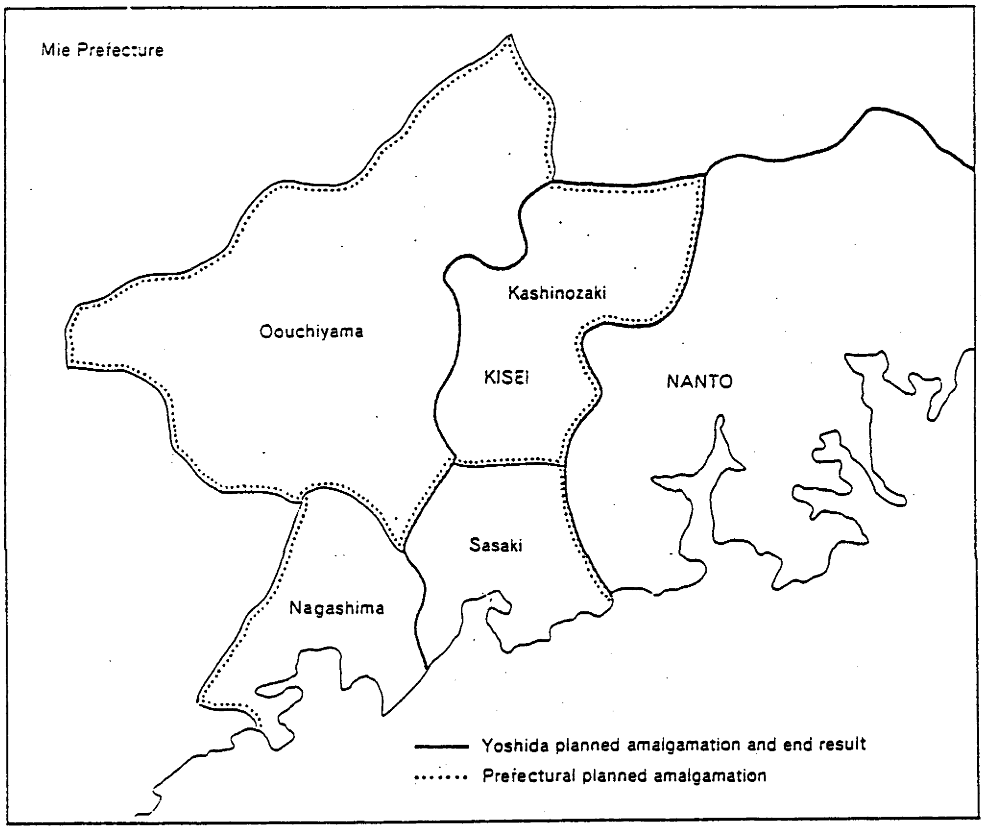
Yoshida's father was a large yellowtail fisherman and had considerable influence within Sasaki. Yoshida was concerned that an amalgamation with Nagashima city would affect his father's influential position in Sasaki, and he set out to persuade the assemblymen and fishermen in Sasaki to oppose Sakaguchi. He argued that amalgamation with the larger Nagashima town would affect adversely Sasaki in two ways. First, the Sasaki assembly would be absorbed into the Nagashima assembly and many of the Sasaki assemblymen would lose their positions of influence. Secondly, he argued that the Sasaki Fishing Co-operative would lose its fishing rights to the bigger and more powerful Nagashima Fishing Co-operative. These arguments were sufficient to create opposition amongst assemblymen and fishermen to Sakaguchi's plan of amalgamating with Nagashima.

At the same time, Ouchiyama rejected the prefectural plan of an amalgamation with Kashinozaki. As noted earlier, Kashinozaki, was an economically underdeveloped area and had financial difficulties. It represented a financial burden which the Ouchiyama assembly did not want to carry. The assemblymen argued that an amalgamation with Kashinozaki would divert resources away from Ouchiyama and would impede their local development plans.

Yoshida saw the problem that Kashinozaki faced in trying to find a partner with which to amalgamate. He persuaded his

MAP 5.2

AMALGAMATION PLANS FOR SASAKI AND KASHINOZAKI (1953)



father to approach the Kashinozaki assembly and propose an amalgamation with Sasaki. The Kashinozaki assembly was more than willing to amalgamate with Sasaki town when Yoshida's father approached them with the proposal. This plan was readily accepted by the electorate in Sasaki as their positions of influence would not be jeopardised by amalgamating with the smaller Kashinozaki town.

After the amalgamation in 1957, conflict emerged within the Sakaguchi faction over the question of leadership in the coming 1959 Kisei town election. There were two other influential people in the Sakaguchi faction. They were Taniguchi Tomomi, Deputy Speaker of the Sasaki town assembly and a powerful figure in the Sasaki Fishing Co-operative, and Nakaseko Bunji, head of the Sasaki Fishing Co-operative. Sakaguchi, Taniguchi and Nakaseko were all classmates in the Sasaki primary school. Both Taniguchi and Sakaguchi wanted to become mayor of Kisei town. Taniguchi also was in conflict with Nakaseko over the leadership of the Sasaki Fishing Co-operative. Taniguchi, a large boat owner who had, in the past, laid off fishermen during recessed periods in the fishing industry, was not popular amongst fishermen and decided to change to the Yoshida faction. Yoshida accepted the support of Taniguchi as his father, the major source of his support, had died soon after the amalgamation. Nakaseko, fearing that Taniguchi's position in the Sasaki Fishing Co-operative would be enhanced with strong support from Yoshida, decided to back Sakaguchi. In the 1959 election, the Yoshida-Taniguchi faction came to power.

In this way, the ruling Yoshida-Taniguchi and opposition Sakaguchi-Nakaseko factions were formed in Kisei. The Sasaki Fishing Co-operative was a major source of political support to both Yoshida and Sakaguchi. Neither could formulate nor implement town policy without the consent of either Taniguchi or Nakaseko who represented their respective electoral bases in the Sasaki Fishing Co-operative.[32]

The Sasaki Fishing Co-operative, under the leadership of Taniguchi, announced a policy of opposition to the project on 17 June, approximately two months before the Kisei town assembly accepted the project. Sakaguchi and Nakaseko knew that Taniguchi was supporting Yoshida in the promotion of the nuclear plant. They were not, however, capable of preventing the assembly accepting the project as Yoshida had obtained the support of the Kashinozaki area and, therefore, had the numbers to push the proposal through the assembly.

The balance of power in Kisei laid with assemblymen from the Kashinozaki area. They had eight members in the Kisei town assembly and Yoshida was able to persuade them to accept the project by arguing that the development of the project would facilitate social and economic development in the Kashinozaki region. Despite political resistance by the Sakaguchi-Nakaseko faction, Yoshida was able to promote the project given expectations in Kashinozaki about the economic benefits which would accrue from the development of the nuclear project.

----

32. Nishimura K., **op.cit.**, pp. 58-60.

Revised expectations and promoter responses

During the period 1965-67, Chubu Electric's expected supply and demand situation changed, and the Ashihama project became important in averting anticipated electricity shortages. The power company tried to influence the Central Committee's stance on the project by appealing to the national and prefectural government. The national government, however, was not willing to support the project strongly because of a favourable supply-demand situation in the Central Electricity Sphere. The power company could only rely on the prefecture to assist in facilitating a settlement. The prefecture was, however, split over the development of the project and, therefore, constrained in exerting pressure on the Central Committee.

Revised expectations

From 1965, changes in the power company's supply situation led to revised expectations about the need to develop the project at Ashihama. In 1965, the power company expected a shortage of approximately 163 MW by 1970. During the subsequent two years, this expected shortfall increased to 885 MW.[33] Continuing expectations for expanded economic activity, particularly in Mie, Shizuoka and Aichi prefectures, led to a re-estimation of projected electricity demand trends. It became essential for the power company to expand capacity to meet that projected demand. The original

----

33. Calculated from data compiled by the Tokyo Electric Power Company, 1983

objective of developing the project, which had been to compete for subsidies with other power companies from the national government, was overshadowed by the objective of averting electricity shortages.

The power company began by revising its completion schedule for the Ashihama plant. In July 1965, it announced that it wanted to reach a settlement with the local electorate within a year so that construction could commence by early 1967. Chubu Electric assessed that the project could start supplying commercial power to the grid by 1972. The power company, however, was not in a position to control the situation locally. It perceived that any attempt to approach the fishing co-operatives in Nanto directly would only intensify opposition to the project.[34]

Chubu Electric could not rely on substantial support from the national government in reaching a settlement with the community. The electricity supply and demand situation in the Central Electricity Sphere did not justify the speedy development of the project. From 1963 to 1967 the expected electricity shortage declined at an annual rate of 37.7 per cent from 6833 MW to 1896 MW.[35] The national government took the view that the benefits of rapid implementation of the project were not great as Chubu Electric could purchase

----

34. Interview with personnel from the Chubu Electric Power Company, 1982.

35. Calculated from data received from the Tokyo Electric Power Company, 1984.

electricity from Kansai Electric.[36] The government also felt that the longer term political costs of pushing the project through quickly, in terms of intensifying local resistance, were too high. Consequently, the national government was not willing to give strong support to the project.[37]

A major conclusion of Chapter 4 was that agreement over energy projects tended to take longer in situations where the national government expected a favourable electricity supply-demand balance in national electricity spheres. The response of the national government is important in the settlement process as it decides whether projects are given Denchōshin approval or not. Chubu Electric discussed the project with the EPA, but the Agency responded negatively. A similar situation occurred in the siting of Hokkaido Electric's Kyowa-Tomari project which is the subject of Chapter 8. The national government was unwilling to support Kyowa-Tomari project strongly because of the high economic costs involved in constructing the project. These two cases are usefully compared with a siting dispute over the

----

36. Chubu Electric had an agreement with Kansai and Hokuriku Electric Power Companies, the other two power companies in the Central Electricity Sphere, to purchase electricity in times of expected shortfalls. Information received from MITI, 1983.

37. The EPA, which is responsible for co-ordinating proposals for Denchōshin approval, judged that the power company had not met the necessary criteria for submission of the project for Denchōshin approval. These included agreement from local mayors, the prefectural governor and fishing co-operatives over the relinquishment of property rights. See Chapter 2 for a discussion of criteria necessary for Denchōshin approval to construct energy power plants. Information received from Economic Planning Agency (EPA), 1983.

Electric Power Development Company's (EPDC) Matsushima coal project which is discussed in Chapter 7. In that dispute, the national government, because of energy security and regional electricity sharing objectives, provided subsidies to the regional electorate to facilitate the settlement process. The reluctance in the past of the central government shaped Chubu Electric's approach to reaching a settlement with the Ashihama electorate.

Limitations of prefectural influence

Unable to get support from the central government, the power company relied more heavily on the prefectural government to enter into the conflict in a way which would assist in the settlement process. Chubu Electric persuaded Tanaka to adopted a more positive attitude toward the development of the project. He had lost support at the prefectural level, but thought that he could regain that support if he could reach a suitable agreement between the affected parties on the project. Tanaka also knew that failure on that front wouldjeopardise his chances in the 1967 election which were at that stage only two years away. He felt that if he were going to take a risk, then he would have to seek agreement and seek it as quickly as possible.[38]

The prefectural government in co-operation with Chubu Electric devised a two tier strategy for attempting to change the attitude of the Central Committee towards the

----

38. Information obtained in an interview with Diet member, 1983.

nuclear power plant. The prefectural government initiated an investigation into the impact of waste water on the marine environment and stated that it would provide a subsidy for regional development. The investigation was aimed at reducing fishermen's concern about the project by using marine experts to suggest that the environmental impact of the plant was not as large as anticipated by the Central Committee. The subsidy was aimed at increasing the expected benefits of accepting the project to both communities in Kisei and Nanto.

Commissioned by the prefecture, marine experts, commenced the investigation in October 1965 and, in December that year, they published an interim report. The report was favourable to the power company's position; it stated that the discharge of waste water would only increase the temperature of the ocean in the vicinity of the outlet pipes and that this would not adversely effect the fishing industry. It concluded that the prefecture should discuss the results of the report with representatives of the Central Committee so that further investigations could take place.

The Central Committee, however, rejected a proposal for meeting with prefectural officials and issued a declaration on the interim report. The declaration contained three major criticisms of the report published by the prefecture. First, the Central Committee argued that the researchers involved in the investigation were selected personally by Tanaka and, therefore, conducted the investigation on the presumption that the project would be developed. They rejected the results, suggesting that they would only provide background information which could be used to promote the nuclear power plant. Second, they argued that it was impossible to obtain even intermediate results in a two month period. Any investigation, they concluded, should take at least a year, on the grounds that the impact of waste water may differ according to the given varying ocean temperatures and currents of different seasons. Third, they criticised the report for not considering specifically the effects of waste water on pearl cultivation. They argued that pearl cultivation was critical to the Nanto economy and that any investigation which did not take into account fully the impact of the nuclear project on pearl cultivation would not be accepted by the Central Committee.[39]

The second component of the prefectural strategy was aimed at providing a subsidy for regional development. On 15 November, the Mie prefectural government published a plan for regional development which incorporated a subsidy for the development of social and economic infrastructure and for the development of the fishing industry. The prefecture hoped that the provision of such benefits would intensify support for the project in Kisei town and among farming and commercial interests in Nanto town, thus isolating and perhaps weakening the opposition stance of the Central Committee.[40]

----

39. See Nakamura K.,**op.cit.**, pp.94-120 and pp.146-150.

40. Information received from personnel of the Chubu Electric Power Company, 1983.

The subsidy which was to be funded by the prefecture amounted to 6700 million yen. Its use was proposed for the development of social infrastructure and the promotion of local industry, such as fishing, in Nanto, Kisei and Nagashima. While Kisei and Nagashima were willing to accept the subsidy, the Nanto assembly rejected the offer. They claimed that the value of the local pearl industry was approximately 3000 million yen and that this was expected to increase in the future. They argued that the subsidy, while providing benefits to the regional community, did not provide direct benefits to fishing interests which expected to be affected directly by the project.

The Nanto town assembly responded to this economic pressure from the prefectural government by strengthening the structure of the opposition movement. On 20 November 1965, the town assembly established the **Nanto chō genpatsu hantai senraku kyōgi kai** [Nanto Strategy Committee for Opposing the Nuclear Power Plant]. This Committee comprised assemblymen and decided on a budget, drawn from town funds, to finance a petition to be sent to the prefectural government. In the middle of December, a petition with 8023 signatures was sent to the prefectural government stating that Nanto residents were opposed to the development of the Ashihama nuclear project.[41]

The prefectural government had virtually no success in persuading the local community in Nanto to accept the project. The continued resistance by Nanto to the nuclear

----

41. See Nakamura K., **op.cit.**, pp.120-128.

project forced Tanaka again to adopt a very cautious posture toward promoting the project. The political cost of further pressure from the prefecture had become high. The prefectural assembly was split over the issue. The 1967 prefectural election was only a year away and Tanaka as well as the majority of LDP assembly men felt that further conflict between the prefecture and Nanto town would have significant electoral implications.

Despite its enthusiasm in principle for the project, the prefecture now sought to end it. On 22 May 1966, Chubu Electric announced that it wished to commence investigations which were necessary for Denchōshin approval and complete those investigations by June. The prefectural government knowing that any action by the power company was politically risky and would probably intensify opposition to the project, attempted to persuade the power company to delay executing the investigations. Chubu Electric nevertheless commenced preparations. After executing those preliminary investigations on 8 August, it declared, on the 25th of that month, that it would start full-scale investigations in September. A key element in the inability of the Mie prefectural government to overcome local opposition, regardless of the size of subsidies offered, was its lack of a workable conduit into the local political process. The leadership had no backing from politicians such as Ishikawa and Satonaka, who had political connections with local fishing interests and who were actually opposing the project. The leadership, therefore, had no inroad into local political processes and this prevented the prefecture from playing a decisive role in resolving the conflict between Chubu Electric and the Central Committee and led it ultimately to block the project to avoid further political fallout. Chapter 6 provides an illustration of the importance of the structure of the regional political organisation and the skill of the political leadership in reducing the settlement time at Chubu Electric's subsequent Hamaoka site.

The abandonment of the project

The Chubu Electric Power Company was, however, confronted with the need to develop the project as quickly as possible to avert expected electricity shortages. It attempted to gain support from Yoshida, the Kisei town mayor, for a change in the design of the project, and persuade the national government to exert pressure on the Central Committee. This strategy further intensified opposition by Nanto fishermen who successfully resisted pressure from national politicians. A misappropriation allegation led to a recall movement in Kisei and Yoshida was ousted from power. The company then had no choice but to abandon the project.

Power company strategies

Thwarted even at the prefectural level, where political support was the strongest, the power company turned to the local level in an attempt to isolate the Central Committee politically. It decided to seek support from Yoshida to change the design of the project and to persuade the national government to enter the conflict and exert its political muscle. Chubu Electric knew now that it could not rely on strong prefectural support for the project, but, it hoped that this strategy, which by-passed the prefecture, would be sufficient to isolate the Central Committee from bargaining processes necessary to strike an agreement over the project. The power company did not wish to bargain with the Nanto co-operative over the transfer of fishing rights. It judged that the co-operative would demand at least 3000 million yen in compensation for the exchange of their property rights. The power company was only willing to pay approximately 240 million yen in accordance with conditions stipulated in the 'Compensation Standards'.[42] The payment of 3000 million yen would have increased the construction cost of the project by approximately 10 per cent and this would have substantially reduced the economic viability of the plant.[43] Because the Ashihama project was expected to be the first nuclear plant in Japan, Chubu Electric was worried that the payment of a large amount of compensation might

----

42. Personnel from the Chubu Electric Power Company told the author that they were only prepared to pay compensation in accordance with the Compensation Standards. The figure of 240 million yen was calculated from the formulae contained in the standards. (See Chapter 2) While this may not be the exact amount the power company was willing to pay for the transfer of property rights, it provides a broad indication of the divergence between what the power company was willing to pay and what the Nanto Fishing Co-operatives were willing to accept to reach settlement over the relinquishment of the fishing rights.

43. The figure of 10 per cent was calculated from data relating to the construction cost of the Ashihama project obtained from the Chubu Electric Power Company, 1983.

become a precedent for other siting disputes, thus inciting criticism from other power companies. The company felt that such trends toward larger payment for property right transfer might be detrimental to the development of the nuclear power industry. An important element in the evaluation of delay is therefore an assessment of demands by property right owners and the impact of those demands on other siting disputes and on the economic feasibility of projects. Chapter 8 illustrates a similar case where Hokkaido Electric was forced to change the location of the Kyowa-Tomari nuclear power plant. Given the Central Committee's concern about the impact of waste water and its powerful bargaining position, the power company decided to change the design of the project. As 70 per cent of the site was in Kisei, the company decided to change the proposed placement of the containment vessel from the boundary of Nanto and Kisei to solely within Kisei. It also planned to change the location of the waste water outlet pipes to a position closer to Kisei. Chubu Electric hoped that this strategy would weaken the Central Committee's bargaining position as the relinquishment of their property rights would not be necessary to reach an agreement over the project.[44]

Officials of the power company, moreover, had developed good relations with the Yoshida-Taniguchi faction in Kisei town. It was through Yoshida and Taniguchi that Chubu Electric attempted to implement the local component of this strategy.

----

44. Information received in an interview with a consultant to the electric power industry, 1983.

Yoshida believed that this change in design would bring more benefits to Kisei as the containment vessel would be solely located in Kisei and, therefore, that town would be the sole recipient of fixed assets taxes. He thought that these increased financial benefits would enhance his political position vis-a-vis Sakaguchi, and persuaded Taniguchi to allow full scale investigations to commence. On the 25 August, the Sasaki Fishing Co-operative stated that it would allow investigations, if the fishing co-operatives in Nanto town gave their approval, despite strong opposition by the Sakaguchi-Nakaseko faction. Two days later, Yoshida announced, without the approval of the Central Committee, that Kisei town would issue Chubu Electric with an investigation permit.

Chubu Electric also persuaded influential national dietmen to visit the area. It thought that a visit by national politicians would persuade the Central Committee that the nuclear project was in the national interest in terms of catching up with the west technologically. On the 7 September, the House of Representatives Science and Technology Promotion Policy Committee, chaired by Nakasone Yasuhiro of the LDP, decided to visit the area in order to persuade assemblymen in Nanto town of the need to develop the project. While the national government was not willing to strongly support the project, Nakasone had a particular interest in the development of the Ashihama plant. He had been an architect of the decision to introduce nuclear power into Japan and wanted to see nuclear development proceed as quickly as possible.[45]

Mobilisation of economic interest groups

The Central Committee had been concerned about Chubu Electric and the prefectural government entering the local area and conducting siting investigations necessary for Denchōshin approval. Members of the Committee set out to stop those investigations. They had been conducting training exercises to monitor and stop vessels entering the area. They conducted daily surveillance operations with the use of local fishing boats off the Kumano coastline. Lookouts were set up to monitor shipping movements and to sound warnings should unidentified vessels enter the area.

The Central Committee established a policy of dealing with the entry of foreign vessels into the area on 21 June 1966. It created seven mobilisation groups, called the Seven Samurai, after Kurosawa Akirā's movie of the same name. These groups would be called into action to surround alien vessels. Each group had a specific function. For example, one group would monitor foreign vessels in particular areas, another would intercept those vessels. The leaders of the committee were concerned that some groups may resort to violence after stopping outside vessels. To minimise this possibility, they established rules which stipulated that a decision to intercept a vessel had to be made by the

----

45. See Sato H., **op.cit.**, pp.10-13

Chairman of the Central Committee and that violence could not be used under any circumstances.[46]

A decision to bring the mobilisation force into action was made on 18 September, in response to a visit planned by Nakasone. Nakasone's visit resulted in the Nagashima Incident, the largest demonstration conducted by fisherman in the post-war period. Hundreds of fishing boats from Nanto surrounded and stopped a Maritime Defence Agency patrol boat off Nagashima city. Members of the Central Committee boarded the patrol boat and reaffirmed their opposition to the Ashihama nuclear plant. The attempt by the national politicians to exert political pressure on the Nanto Fishing Co-operatives had failed.

Factional power struggle

While this was going on, the power company continued its attempts to win agreement from Kisei to develop the project. On 15 November 1966, Kisei town signed an agreement with Chubu Electric which allowed the power company to commence full-scale investigations. The power company had, reportedly, been giving financial contributions to Kisei town. The contributions were apparently being channelled to Taniguchi so that he could persuade fishermen in the Nakaseko faction to accept the project. During the latter part of December and the beginning of January 1967, local residents in Kisei town became aware that these contributions had been given to the town and became

----

46. See Nakamura K., **op.cit.**, pp.167-185.

concerned about the misappropriation of those contributions.[47]

Residents, particularly in Kashinozaki, became concerned that Yoshida, by transferring large financial contributions to Taniguchi, was promoting the project for the good of Sasaki at their expense. Earlier expectations that the development of the project would benefit them were shattered. Subsequently, they started a movement to receive compensation from the town and Chubu Electric. On 24 January, eight assemblymen from Kashinozaki resigned from the Kisei town assembly. The Sakaguchi-Nakaseko faction, seeing this as an oppportunity to seize power in Kisei, joined forces with the assemblymen from Kashinozaki town and commenced a recall movement to oust Yoshida. Yoshida lost the vote by 1344 to 2242 votes, and on 28 April, Sakaguchi was elected mayor of Kisei town. Sakaguchi, subsequently, announced a policy of opposition to the project.[48]

Chubu Electric was then confronted with opposition to the project by both Nanto and Kisei town assemblies. The prefecture was not willing to support the project, nor could the national government exert any pressure on the local electorate to accept the proposal. The power company had no choice but to abandon the Ashihama project and consider an alternative location on which to site its first nuclear power plant.

----

47. Interviews with consultant to electricity power industry and Chubu Electric Power Company, 1983.

48. Information received from a Diet member, 1983.

Interest groups and project delay

The existence, structure and representation of regional interest groups is an important factor determining settlement times over the construction of energy power projects. The existence of large and powerful interests who expect to be adversely effected by project developments and who either have or can successfully gain access to decision making is likely to lead to delay in the settlement process. Even if promoters place a high value on projects, they may not be capable of compensating adequately large and powerful interests who expect to incur costs as a result of project implementation.

Fishing co-operatives in Nanto opposed the Ashihama project. They had been experiencing a boom in the pearl industry which was a major pillar in the local economy. The economic structure of the pearl industry, which required specialisation in production and established relationships between fishing co-operatives, facilitated the formation of an alliance which formed the basis of their opposition. Specialisation in the production process meant that the adverse impact of the project was expected to spread evenly across the fishing industry in Nanto. The economic structure of the fishing industry was a critical factor explaining the strength and tenacity of the resistance by the fishing community. The Central Committee had important political connections with prefectural politicians and persuaded them to oppose the project at the prefectural level. It also persuaded local farmers to resist the project. The ability of fishing interests to gain the support of farmers and to strengthen their representation in the local political process enabled them to establish an anti-nuclear town policy and improve their bargaining position vis-à-vis Chubu Electric.

Revised company projections increased the importance of installing the project to avert expected electricity shortages. The power company, however, was not willing to compensate fishing interests adequately. The amount of compensation that was required to strike a settlement was measurable, but payment of that compensation would have substantially increased the cost of the Ashihama plant. Chubu Electric could not control the outcome of the settlement process. It sought to persuade the prefectural and national governments to influence regionaldecision-making processes. It also sought to change the design of the project so that it would not have to negotiate with Nanto Fishing Co-operatives over the transfer of fishing rights. The company hoped that this strategy would , to a large extent, isolate Nanto fishing interests from bargaining processes necessary to strike a settlement over the construction of the project.

The ability of the prefecture to influence the fishing co-operative's stance on the project was severely limited. The government placed a high priority on the project to attain social and economic policy objectives. It sought to provide a subsidy for regional economic development. A major objective was to create broader regional support for the project against narrower sectoral fishing interests. The subsidy, however, did not provide adequate remuneration to fishing interests and only served to intensify their opposition. The use of a broadly based subsidy approach to the dispute was not effective because it did not provide direct benefits to fishing interests.

The conflict over the development of the project led to a split within the prefectural LDP between fishing interests and pro-development interests. This made strong prefectural support for the project difficult because of perceived ramifications in the coming elections. The political costs in terms of LDP party stability and a possible electoral backlash became higher than the economic benefits stemming from the project and immobilised the prefecture from playing a positive role in the settlement process.

The national government was not willing to support strongly the development of the project. There was a favourable electricity supply and demand situation in the Central Electricity Sphere and there was, therefore, no powerful economic justification for supporting the project. In contrast, national politicians, such as Nakasone, who had been involved in the introduction of nuclear technology in Japan, did not wish to see nuclear development impeded by local interests. They attempted to visit the area and persuade local fishermen of the national interest in the project in terms of catching up with the west technologically. This was rejected by local fishermen who placed a higher priority on local rather than national interests.

Historical conflict between competing interests in Kisei also hampered the settlement process at Ashihama. Chubu Electric had developed good relations with the ruling Yoshida faction and sought to change the location of the project to a position solely in Kisei. It was content to rely on the Yoshida faction to deliver community agreement. Yoshida's major objective in promoting the project was to enhance his political power within the town. He sought to provide benefits from the project to the Sasaki Fishing Co-operative, his major support base. This approach was reflected in the misappropriation allegation, after which local residents particularly in Kashinozaki, became concerned that they might not benefit from the project. This provided an opportunity for the opposing Sakaguchi faction to win the support of dissatisfied residents and oust Yoshida from power.

The Ashihama project was delayed and ultimately abandoned by the Chubu Electric Power Company because of strong opposition by local economic and political interest groups. These groups expected to incur large losses from the project development and were able to gain access to key local decision-making centres. The national and prefectural governments were not capable of persuading local interest groups to accept the project. Under these conditions, the cost of reaching a settlement with the local electorate was unacceptably high and the power company decided to abandon the project in favour of an alternative location at Hamaoka. Chapter 6 considers the settlement process at Hamaoka and examines why Chubu Electric was able to reach a relatively quick settlement with the local community over the development of its first successful nuclear power project.

6

THE INFLUENCE OF SOCIAL VALUE

The value that project promoters place on the development of energy power plants can be a critical element influencing the speed at which settlements can be reached over the implementation of projects. Settlements are likely to be short in situations where promoters, such as power companies and the regional political organisation, attach a high priority to project development and where they have similar interests and objectives. Promoters who wish to construct power stations quickly can act together in weakening ideological resistance movements. They can facilitate settlements by isolating the opposition from the negotiating process and providing a bargaining table at which project promoters and regional interests can strike a settlement.

The Chubu Electric Power Company successfully located a nuclear power plant in the town of Hamaoka in Shizuoka prefecture in 1969. The time taken to reach settlement over the project was 23 months, and was substantially shorter than the average public acceptance times for initial nuclear and fossil-fuelled plants.[1] After Kansai Electric's Oi nuclear project, it was the quickest settlement reached for an initial nuclear power plant in Japan.

Chubu Electric under-estimated the time necessary to reach an agreement by 17 months. The statistical models developed

----

1. Average public acceptance times per initial nuclear and fossil-fuelled plants are 82.0 months and 38.3 months respectively. See Chapter 2.

in Chapter 4 provide a better basis on which the public acceptance time could have been estimated. The predictive model over-estimates the settlement time by 1 month. In contrast, the evaluative model under-estimates the time by 8 months. The statistical models take into account, explicitly, the expected distribution of costs and benefits of the project and, therefore, appear able to provide a better basis for assessment of the time required to win approval for the project than that upon which Chubu Electric relied.

The expected distribution of costs and benefits were structured in a way which facilitated a quicker than average settlement at Hamaoka. Chubu Electric and the national government placed a high value on the installation of the nuclear power plant to avert electricity shortages which were expected in regional electricity spheres. Income growth was relatively high in Shizuoka prefecture and there was a strong community desire for further expansion. Social attitudes placed relatively little weight on the risks involved in accepting the nuclear plant.[2] Models that capture those influences appear to explain adequately the time required for Chubu Electric to reach agreement with the community in Shizuoka. The willingness of Chubu Electric and the regional political organisation to develop project, as measured through the statistical analysis, coincides with their ability to weaken a leftist anti-nuclear movement which emerged and to negotiate a settlement relatively

----

2. Refer to Chapter 4 for a more complete discussion of relationship between these factors and settlement times for energy projects.

quickly. An analysis of the value that promoters place on project development and the extent to which their interests and objectives are similar is a critical element in the evaluation of settlement times. Assessments can be improved marginally by taking into account the ability of the regional political organisation to create a bargaining environment which minimises outside interference on the negotiating process.

After learning of the proposal to site a nuclear plant in Hamaoka, fishing co-operatives joined forces with a leftist anti-nuclear movement and attempted to impede the implementation of the project. This resistance did not succeed in substantially delaying the project. The regional political organisation promoted the project to attain regional social and economic objectives and responded very quickly to the emergence of opposition. Backed by Chubu Electric, the leadership was able to weaken the alliance by causing a split between the leftist movement and fishing interests, thereby preventing the leftist movement from sucessfully hampering negotiations between the power company and regional interests over compensation and property rights transfer arrangements. Project promoters then removed the leader of the fishing interests, who was opposing the project, and installed a new leader who was more willing to negotiate a settlement.

Economic and political support

In July 1967, the Chubu Electric Power Company internally made a decision to locate a nuclear power plant in Hamaoka and anticipated that it would be able to submit the project for Denchōshin approval by December that year.[3] The speed at which the power company wished to locate the plant was directly attributable to an expected electricity supply shortage. Chubu Electric's assessment of the supply situation strongly influenced its approach to reaching social and political settlement with the community in Hamaoka. The power company, through the prefectural and local government, was able to create substantial interest in the project. The regional government was willing to accept a nuclear power plant in order to attain social and economic policy objectives.

Expected electricity shortfalls

During 1966, the Chubu Electric Power Company was facing substantial opposition to the siting of the Ashihama nuclear power plant which it proposed to build on the border of Nanto and Kisei towns in Mie prefecture. In 1966, Nanto town opposed the project as a result of fishing co-operatives gaining electoral access to the town assembly. In early 1967, the mayor of Kisei town, who had been a key figure in promoting the project, was forced to resign as a result of a misappropriation allegation which led to a recall movement. It was then clear to the power company that the Ashihama project would have to be abandoned for the forseeable future.

----

3. See **Sankei Shinbun** [Sankei Newspaper], 5 July 1967. A chronology of the major events in the siting of the Hamaoka nuclear project is contained in Appendix 4.

Chubu Electric's siting options were becoming increasingly limited and appeared to the power company to be restricted to Shizuoka prefecture. Chubu Electric's supply sphere consists of Nagano, Gifu, Aichi and Mie in addition to Shizuoka prefectures. Nuclear and fossil-fuelled plants could not be constructed in the inland prefectures of Nagano and Gifu,[4] and the availability of sites for large-scale hydroelectric capacity was virtually exhausted. The emergence of pollution problems in Aichi prefecture was causing major difficulties in obtaining agreement from communities to locate power stations in that prefecture. Attempting to locate additional nuclear or fossil-fuelled capacity in Mie prefecture was politically risky given the sensitivity of the Ashihama issue.[5]

The Hamaoka nuclear plant became essential to Chubu Electric in averting major electricity supply shortages. Between 1966 and 1967, expected electricity demand calculated in the power company's five year forecast had increased steadily from 4950 Megawatts (MW) to 7840 MW. Actual supply for the same period had increased from 4950 MW to 5345 MW. Chubu Electric had been relying on the development of the Ashihama power plant alongside the development of Nishi-Nagoya and the Atsumi fossil-fuelled plants which were under

----

4. As noted in Chapter 2, it is not generally possible to locate nuclear and fossil-fuelled projects in inland areas because of the existence of mountainous terrain and a lack of cooling water.

5. Information received in interviews with personnel from the Chubu Electric Power Company, 1982.

construction to fill approximately 50 per cent of the expected shortage in supply. The abandonment of the Ashihama project, however, placed the company in a position of expecting a shortfall of approximately 1900 MW in supply capacity on forecast demand by 1972.

From 1967 to 1969, expected electricity shortages on five year forecast demand declined a little from 1400 MW to 1374 MW. This shortage was only a little greater than the average shortage of 1297 MW experienced by other power companies which have developed projects in Japan.[6] Although the power company placed some importance on the development of the project, the extent of the expected electricity shortage was not a critical factor explaining why the settlement time at Hamaoka was relatively shorter than at other areas.

The critical factor, rather, was the expected supply situation in the Central Electricity Sphere which comprises Chubu, Kansai and Hokuriku Power Companies. Between 1967 and 1969, expected electricity shortages were increasing at a rate of 26.25 per cent per annum. This was substantially higher than the average of 5.92 per cent per annum in other regional electricity spheres where projects were developed.[7] Given the relatively large expected electricity short fall in the Central Electricity Sphere, it might not have been

----

6. Data compiled by the Tokyo Electric Power Company and Shigen enerugii chō kōeki jigyō bu, **Dengen kaihatsu no gaiyō: sono keikaku to kisō shiryō**, [An Outline of Plant Development in Japan: Plans and Basic Data], Tokyo, various issues.

7. Data complied by the Tokyo Electric Power Company and Shigen enerugii chō kōeki jigyō bu, **op.cit.**, various issues.

possible to purchase all of the required electricity from other power companies such as the Tokyo Electric Power Company. The Hamaoka project was, therefore, necessary in order to balance electricity supply and demand in the Central Electricity Sphere. The priority that both Chubu Electric and the national government placed on the project was important to the speed at which they attempted to reach agreement with the electorate in Shizuoka prefecture to install the plant.

Creating political support

The top management of Chubu Electric was particularly worried about the posibility of electricity shortages. In early 1967, Kato Osaburo, president of the company, discussed a proposal to site a nuclear power plant in Shizuoka prefecture with Mizuno Shigeru, President of the **Sankei Shinbun** [Sankei Newspaper], and an influential businessman in Shizuoka.[8] Mizuno subsequently took the idea to Maruo Kenji, a prefectural assemblyman affiliated with the Liberal Democratic Party (LDP). Mizuno and Maruo were close friends and had both been born in Hamaoka in a hamlet called Sakura. They both felt that Sakura would be an ideal location for the project.[9] Map 6.1 illustrates the location of the Hamaoka nuclear plant, surrounding areas and the structure of property rights in the region. Mizuno and Maruo played an important role in cultivating an interest in

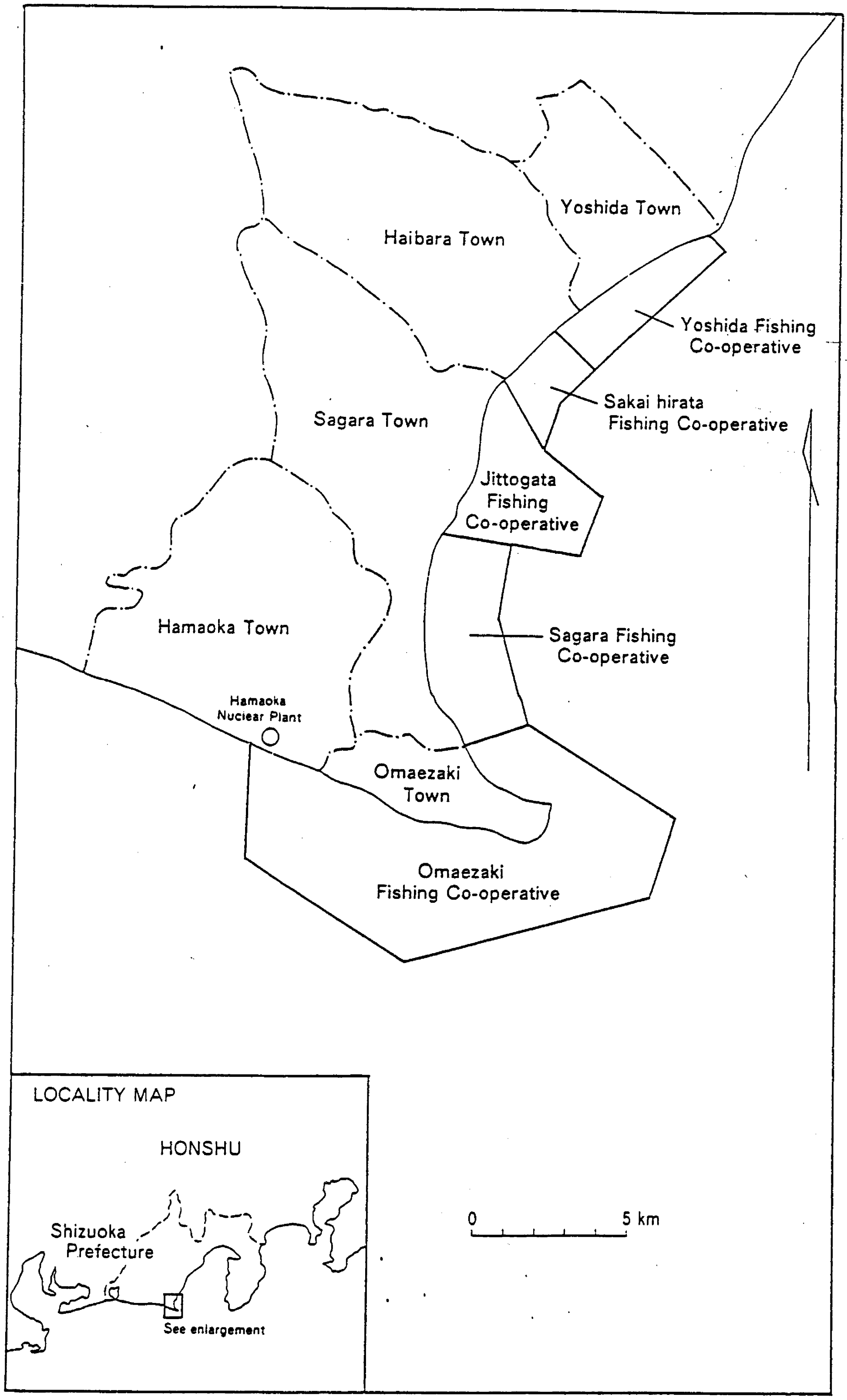
----

8. Information received from Chubu Electric, 1982.

9. Information received in an interview with a previous mayor of Hamaoka, 1982.

MAP 6.1

LOCATION OF HAMAOKA NUCLEAR POWER PLANT AND STRUCTURE OF PROPERTY RIGHT OWNERSHIP



the proposal at the prefectural level and it was thought that the construction of a nuclear power plant could form a major pillar in the prefecture's economic development plans. The government had already published the seventh prefectural development plan in 1966. That plan had three important economic policy priorities. The first was to sustain the high level of economic growth in the prefecture. The second was to increase electricity self-sufficiency in the prefecture. The third was to promote balanced regional development. The proposed nuclear project was consistent with achieving these social and economic priorities.[10]

During the immediate post-war period, Shizuoka lagged behind the rest of Japan in terms of economic growth. By the late 1960s, however, the prefecture had entered a high economic growth. Per capita income was increasing at an annual rate of 11.18 per cent and the prefectural government wished to expand this growth even further. With the average per capita income growth rate for other areas with energy projects at 12.6 per cent per annum.[11] it was easy to persuade the prefectural government to accept a nuclear power plant. The government was not greatly concerned about the impairment of the environment which would result from the development, or the risk involved in accepting the nuclear project.

----

10. Information received from an official of the Shizuoka prefectural government, 1982.

11. Calculated from Asahi shinbun sha, **Asahi nenkan** [Asahi Yearbook], Asahi shinbun sha, Tokyo, various issues, 1966-1970.

In Shizuoka prefecture, electricity demand had been increasing at a relatively fast rate. The development of hydroelectric capacity, the major source of electricity supply in this prefecture, had not kept pace with demand increases. In the early 1960s, Shizuoka was a net exporter of electricity to other regions. By 1967, electricity self-sufficiency had declined to 85 percent.[12] As a result, Shizuoka had been purchasing electricity from other areas, such as Tokyo and Kanagawa. As electricity demand in those areas increased, however, the prefectural government thought that it would become increasingly risky to rely on outside sources of electricity.[13]

Shizuoka prefecture is divided economically into eastern, western and southern regions. The eastern and western regions had been experiencing rapid growth. They were geographically close to Keihin and Kansai districts which had been growing very rapidly. The high demand for goods and services in the Keihin and Kansai districs provided stimulus to the eastern and western Shizuoka. The southern region had, however, lagged behind the rest of the prefecture. In 1966, this region comprising the towns of Hamaoka , Omaezaki, Sagara and the city of Yoshida, had been designated as an underdeveloped region under the criteria set out in the Law for the Promotion of Industrial

----

12. Refer to Nihon enerugii keizai kenkyujo, **Chiiki betsu enerugii juyō tokusei no bunseki** [Characeristics of Energy Supply and Demand in Japan by Prefecture], Nihon enerugii keizai kenkyujō, Tokyo, 1980.

13. Information obtained from a previous deputy-governor of Shizuoka prefecture, 1983.

Development.[14] The government wished to stimulate economic development in the southern part of the prefecture.

The power company, through Maruo, established connections with Kamogawa Tadaichi, an important figure with substantial political influence in Hamaoka. Kamogawa, like Maruo and Mizuno, had been born in Sakura hamlet, and had been an influential land owner before the Pacific War. He subsequently became the inaugural mayor of Hamaoka town when it was formed in 1955, and was head of the **Sakura nōkyō** [Sakura Agricultural Co-operative]. He also had a personal interest in the development of the project, since the Sakura Agicultural Co-operative was having financial difficulties and Kamogawa saw the sale of land as a way of stabilising the financial structure of the co-operative.[15]

Kamogawa also thought the project would provide a good stimulus to the town economy by providing a stronger tax base and an expansion of employment opportunities. Hamaoka, like the rest of the local areas in the southern part of Shizuoka, was economically underdeveloped. Approximately 60 per cent of the workforce was employed in agriculture. The town had no industrial base. Many young people were leaving the town in search of better employment opportunities. The tax base of the town was weak. The town was 80 per cent

----

14. This law encouraged industry to locate projects in specified underdeveloped areas so that balanced regional economic growth would be possible. The main criteria for a region being designated as underdeveloped was that it had a financial index of less than 0.30. Information received from the Ministry of International Trade and Industry (MITI), 1983.

15. Interview with previous mayor of Hamaoka, 1983.

dependent on prefectural and national government finances and the development of social and economic infrastructure had suffered.[16]

In early 1967, Chubu Electric undertook secret surveys of the area to ascertain the response of the Hamoaka electorate to the project. These surveys concluded that the local community was facing economic hardships and that the town administration would be more than willing to facilitate the development of the project. Power companies in Japan tend to attempt location of nuclear projects in areas which are facing social and economic difficulties. This approach to site selection presumes that the local government will provide the necessary administrative support in the settlement process. The local government in Hamaoka, as in Nanto and Kisei towns, initially played very important roles in creating the necessary support for the implementation of the project.

Kamogawa suggested to power company officials that the proposal should not be raised until after the local government elections scheduled for March 1967. There had been considerable community dissatisfaction with mayor Shinozaki's social and economic development plans, and Kamogawa thought the project might be jeopardised if it were to become an election issue. He felt that Shinozaki would

----

16. See Hamaoka cho yakuba, **Hamaoka: Shizuoka ken hamaoka chō chōsei yōran** [Hamaoka Town: A Survey], Hamaoka chō yukuba, 1982 and Jichi shō zaisei kyoku shidō ka, **Shichōson betsu kessan jōkyō shirabe** [An Examination of Local Financial Accounts], Jichi shō zaisei kyoku shidō ka, Tokyo, 1968.

use the issue to regain support which he had lost amongst local politicians for failure to implement an economic development policy for the town. Kamogawa assessed that raising the nuclear issue might lead to infighting within the local LDP and that such conflict might hamper the development of the project.[17]

Chubu Electric accepted this advice without hesitation. The power company had a bitter experience with political infighting in the siting of the Ashihama project. As noted in Chapter 5, the failure of the company to recognise and manage effectively factionalism within the Kisei LDP was a major reason for the abandonment of the Ashihama project. Chubu Electric had learnt a valuable lesson and top management could not afford a similar situation occurring in the context of the implementation of the Hamaoka project. Even though there were expected electricity shortages, Chubu Electricpreferred to delay project implementation so that Kamogawa could create a political situation which was conducive to ultimately reaching a quicker settlement. The Ashihama experience had taught the company that pushing too quickly for a settlement could lead to substantial opposition to project development.

In the March 1967 elections, Kamogawa successfully supported Kawarazaki Mitsugi who had also been born in Sakura and was a school colleague of Maruo. Kamogawa believed that Kawarazaki, although uncertain politically as a newly elected mayor, would support the power plant proposal given

----

17. Interview with previous mayor of Hamaoka, 1983.

his relationship with Maruo. Kawarazaki was surprised to learn of the plan to develop a nuclear project in Hamaoka. He immediately spoke, however, to Maruo who convinced him that the project would be in the best interests not only of the town but also the prefectural economy. Maruo also pledged his support for the development of the project.[18]

Kawarazaki's first task was to create political and administrative support for the project. He established the **Hamaoka chō kaihatsu chōsa iinkai** [Hamaoka Development Investigation Committee; hereafter referred to as the Investigation Committee]. This committee, chaired by Kamogawa and comprising town politicians and officials, considered the physical feasibility of siting a nuclear power plant in Sakura. These investigations concluded that there was adequate land in Sakura on which to locate a project and that the land was geologically stable enough to cope with a relatively large earthquake.[19]

Emergence of regional opposition

Chubu Electric's plan to locate a nuclear power plant in Hamaoka was leaked to the **Sankei shinbun** [Sankei Newspaper] on 5 July. The newspaper article revealed that the power company, along with town officials, had been secretly conducting a preliminary study of the suitability of Hamaoka as the possible location for a nuclear power plant. It also

----

18. Interview with a number of influential politicians in Hamaoka, 1983.

19. Information received from Chubu Electric, 1982.

stated that Chubu Electric wished to reach an agreement to site the project by December 1967.[20]

Subsequently, opposition by leftist political parties and their affiliates, local residents in Hamaoka and fishing co-operatives from neighbouring areas rapidly emerged. By October, these groups had formed an alliance and, although financially weak, geographically dispersed and diverse in ideology, they were in a strong position to jeopardise the project. The promoters did not foresee the emergence of this opposition nor did they anticipate the speed at which the movement would develop an organisational base from which to impede the implementation of the power plant. The unexpected emergence of opposition to the plant was the major reason for Chubu Electric under-estimating the time required to win approval over the development of the project.

Ideological and citizen resistance

Groups with ideological objections to nuclear power, such as the Japan Socialist Party (JSP), **Sōhyō** [The Regional Council of Trade Unions] and the Japan Communist Party (JCP) quickly became vocal on the issue not only in Hamaoka but also in surrounding areas, such as in Ogase city. These groups were concerned with two major nuclear safety issues. The first was that Hamaoka was relatively more densely populated than other areas such as Fukushima and Mihama towns, where

----

20. See **Sankei shinbun**, [Sankei Newspaper], 4 July 1967 and **Asahi shinbun: shizuoka ban** [Asahi Newspaper: Shizuoka Edition], 5 July 1967, evening edition.

nuclear power plants were also being proposed. The second was that a fault line ran to the north of Hamaoka and there were doubts about the ability of the containment vessel to withstand a large earthquake.[21]

Other opposition groups consisted of local residents of Hamaoka and included lawyers, shopkeepers, school teachers, housewives and some local farmers. An important figure in the movement was Ono Yasuhiro, a lawyer and historian who had compiled a radical interpretation of the history of Hamaoka. The town had rejected his work as the official history of the town which had further cemented his anti-establishment attitude.[22] Ono was later to become an important figure in the alliance with the fishing co-operatives. These citizens groups, like their ideological counterparts, were concerned with the risk involved in living close to a nuclear power plant.

----

21. **Shizuoka chunichi shinbun** [Shizuoka Central Newspaper], 16 August 1967 and **Asahi shinbun: enshu ban** [Asahi Newspaper: Enshu Edition], 19 September 1967 and interviews with members of the anti-nuclear movement in Hamaoka town. See Kogai taisaku shizuoka ken renraku kaigi, **Kogai to shizuoka kenmin**, [Pollution and the Shizuoka Community], No. 6, Kogai taisaku Shizuoka ken renraku kaigi, Shizuoka, 1980, pp.76-91 for a history of the movement opposing the siting of the Hamaoka nuclear power plant. Mori S., **Genpatsu no machi kara: tokai daijishintai jō no hamaoka genpatsu**, [From a Nuclear Town: The Hamaoka Nuclear Power Plant Located on the Tokai Fault], Hatatashoten, Tokyo, 1982, contains an analysis of the earthquake issue as it relates to the siting of the Hamaoka nuclear power plant.

22. Interviews with officials from Hamaoka town, personnel in Chubu Electric and officials from Sōhyō, 1983.

Economic resistance

To the east of Hamaoka the Hainan Fishing Co-operative operates. It comprises the Omaezaki, Sakai hirata, Sagara, Jittōgata and Yoshida Fishing Co-operatives. This co-operative, while being smaller than the Nanto co-operative in Mie prefecture, was the largest in Shizuoka and unlike the Nanto co-operative, it included a high proportion of deep sea fishermen. Approximately 70 per cent of the catch was deep sea tuna while the remainder was made up of coastal fish, predominantly white bait. The coastline from Hamaoka eastward to Yoshida is endowed with a shallow shore reef which provides an ideal environment for white bait.[23] Coastal fishermen relied heavily on white bait for their livelihood, and had developed special drag nets to increase production.[24]

Chubu Electric knew about the existence of the Hainan Fishing Co-operative to the east of Hamaoka, but had been unaware, at the time of the newspaper leak, that this co-operative had inherited the fishing rights of the then-defunct Sakura Fishing Co-operative in Hamaoka.[25] This had come about through the amalgamation, in 1962, of the Sakura co-operative with the neighbouring Omaezaki Fishing Co-operative. In 1963, as a result of changes to the National Fishing Law, five co-operatives had further amalgamated to

----

23. Information received from the Omaezaki Fishing Co-operative, 1983.

24. **Ibid.**

25. Information received from Chubu Electric, 1983.

form the Hainan Fishing Co-operative. The Hainan co-operative thus had a legal and legitimate claim for compensation in the settlement process.[26]

Many fishermen were worried about the environmental impact of the project. The major concern amongst the fishermen was the effect of radiation and waste water on the marine environment and the possible reduction in the value of their catch as a result of the operation of the power plant. They argued that waste water discharged from the plant would increase the temperature of the water around the shore reef, the breeding ground for white bait. Fishermen suggested that changes to the marine environment would adversely effect white bait breeding and that this would effect the longer term viability of the fishing industry.

These worries found a leader in Hata Toju of the Sagara Fishing Co-operative. This co-operative was particularly dependent on white bait trawling on the shore reef in front of Hamaoka and stood to lose the most from the development of the project.[27] At the same time, Hata himself was also ideologically opposed to the nuclear power plant. Hata had spent time in Manchuria during the Pacific War and, after returning to Japan, joined the JCP in 1955. He subsequently became chairman of the Ogase JCP in 1958 before becoming head of the Sagara Fishing Co-operative in 1963.[28]

----

26. Interview with personnel from the Omaezaki Fishing Co-operative and Chubu Electric, 1983.

27. Interview with member of the Sagara Fishing Co-operative, 1983.

28. Interview with officials of the Ogase branch of the JCP, 1983.

In July, Hata led a small group of fishermen on a visit to Ashihama to study the opposition strategies of the successful Nanto Fishing Co-operative. He concluded that the underlying factor in the success at Nanto was the formation of an alliance between the co-operatives. Upon returning, he established the **Hamaoka chō settchi hantai kyōgōkai** [Alliance for Opposing the Development of the Hamaoka Nuclear Power Plant; hereafter referred to as the Fishing Alliance] which included the Omaezaki, Sakai hirata, Sagara, Jittogata and Yoshida co-operatives and he was elected its leader. The Fishing Alliance adopted a policy of absolute opposition to the development of the nuclear power plant.[29]

Alliance formation

Meanwhile, by September 1967, Chubu Electric, together with the political leadership of Hamaoka, had proceeded to the stage of negotiations with land right owners. The Fishing Alliance and the other anti-nuclear groups were concerned with this development and decided to join forces to oppose Chubu Electric and the Hamaoka town administration. On 3 October 1968, Hata and Ono, the leaders of the main opposition formed the **Genpatsu hantai kyōtō kaigi** [Anti-nuclear Struggle Committee; hereafter referred to as the Struggle Committee]. The views of Hata and Ono were similar. Both opposed nuclear energy on ideological grounds,

----

29. See **Shizuoka chunichi shinbun** [Shizuoka Central Newspaper], various issues, 4-9 October 1967 and Haraguchi I., **Gyōgyō to genpatsu** [The Fishing Industry and Nuclear Power], Kumano genpatsu chōsa kenkyūkai, Mie, 1973.

regarding it as a technology that was still in the experimental stage and could be introduced commercially. Their followers, by contrast, were less compatible ideologically. Fishermen are extremely conservative in their outlook in Japan and tend to distrust leftist groups and their ideology.[30] Both interests however, regarded the situation in Hamaoka with concern. Hata and many coastal fishermen, felt that Chubu Electric and Hamaoka were developing the project at their expense. These fishermen were, therefore, willing to trade ideology for an improved bargaining position against the promoters of the nuclear power project.

Both Hata and Ono saw the alliance as providing the most efficient way of increasing their political capacity to oppose the project. They assessed that each group had weaknesses which would inhibit its ability to oppose the project successfully if it were to act unilaterally. The citizens and leftist movement was relatively small and did not possess a strong support base in Hamaoka. The movement was financially weak and was dispersed geographically. While the citizens groups were based in Hamaoka, the leftist political groups were being organised from outside Hamaoka, especially by the Ogase branch of the JCP and Sōhyō. There was only one Communist Party assemblyman in the Hamaoka assembly, while the JSP had no representation in the assembly. The movement, therefore, only had limited

----

30. This observation was based on interviews with members of the Hamaoka anti-nuclear movement and the **Zenkoku gyōgyō rengōkai** [National Federation of Fishing Co-operatives], 1983.

access to centres of decision-making. Hamaoka town did not have a history of labour movements or rural uprisings.[31]

The local leftist movement had little political, moral and financial support from political parties at the prefectural level. The JSP and JCP jointly held approximately 40 per cent of the seats in the prefectural assembly, and this was 20 per cent higher than their average representation in other areas which subsequently developed nuclear projects. Leftist political parties, however, had lost five seats in the 1966 election[32] and were uncertain about electoral implications of opposing the nuclear plant which was being portrayed as in the community's economic interest.

Hata, on the other hand, found difficulties in mobilising the majority of fishermen in the Fishing Alliance. Only a quarter of the total fishermen in the Hainan Co-operative were involved in the demonstration at Sagara in August 1967. This reflected not only the ideological differences, but also the economic structure of the Hainan Co-operative. The project, while unfavourable to coastal fishermen, did not affect adversely the operations of deep sea fishermen whose catch consisted predominantly of tuna from waters in the Oceania region. The expansion of the deep sea fishing industry had put the many deep sea fishermen in debt and

----

31. Interviews with members of the Hamaoka anti-nuclear movement, 1982.

32. See Sōrifu tōkei kyoku, **Nihon tōkei nenkan**, [Japan Statistical Yearbook], Nihon tōkei kyō kai and Mainichi shinbun sha, Tokyo, 1968.

they were borrowing heavily to pay off and maintain large fishing vessels. While they were interested, therefore, in obtaining generous compensation for the project, they were not at all intent on preventing it. The financial base of the co-operative, like that of their ideological counterparts, was also weak.[33]

To have a chance of success, Hata and Ono needed to move quickly. They knew that Chubu Electric's bargaining position would be enhanced greatly after the completion of land negotiations. The power company would own the land and could, therefore, with the permission of the town, commence detailed investigations and preliminary construction. The strategy of the anti-nuclear groups, thus, was to try to hamper the land negotiations by sensitising the nuclear safety issue. They hoped that some landowners would not sell their land if they could be convinced of the dangers associated with the installation of a nuclear project. They distributed pamphlets, conducted car parades and boat demonstrations; collected signatures from local residents and appealed to local and prefectural and assemblies.[34]

The size, structure and strategy of the Hainan fishing co-operative was different from that of the Nanto co-operative in the Ashihama dispute. The Nanto co-operative was larger, employing 70 per cent of the local population in Nanto. In contrast, the Hainan co-operative only employed

----

33. Interviews with officials from Omaezaki town and the Omaezaki Fishing Co-operative.

34. Information received from the Hamaoka anti-nuclear movement, 1982.

approximately 30 per cent of the regional population. Prospects in the two co-operatives also differed. The annual value of the pearls in Nanto was approximately 1200 million yen and, as the industry was experiencing a pearl boom, this was expected to increase in the future. The annual value of fish caught by the Hainan Co-operative, on the other hand, totalled approximately 300 million yen and there were no prospects for rapid expansion of the fishing industry there.

The impact of the nuclear project differed within both co-operatives. In Nanto, the expected adverse effects of waste water discharged from the project were evenly spread across the entire industry. It will be recalled from Chapter 5 that the pearl industry was based on specialisation in the production process. The project was, therefore, perceived to have a large negative impact on the whole pearl industry. In contrast, the impact of the project differed for the co-operatives comprising the Hainan Fishing Co-operative. While waste water was expected to affect coastal fishermen adversely, it was not perceived to have a negative impact on deep sea fishermen.

The differing size and economic structure of the co-operatives influenced their approaches to improving their respective bargaining positions with Chubu Electric. The Nanto co-operative did not rely on leftist political elements in the formation of the alliance. The Hainan co-operative was in a weaker bargaining position with the power company and, therefore, felt that the formation of an alliance with the leftist anti-nuclear movement was essential to opposing the project successfully.

Isolating ideological resistance

Chubu Electric, as well as the political leadership at both the prefectural and local levels, were worried by the emergence of resistance to the project. They did not expect fishing co-operatives from neighbouring areas to take a position of opposing the nuclear power plant and they had not anticipated that the fishing co-operatives would join forces with leftist political elements. The promoters were also concerned that the anti-nuclear movement might be able to impede negotiations over the transfer of land rights. The political leadership, in conjunction with the power company, responded quickly by addressing the safety question and attempting to weaken the influence of the leftist movement thus isolating that force from property right owners.

Town leadership

The emergence of the anti-nuclear movement in Hamaoka had heightened awareness within the community about the potential environmental hazards associated with nuclear energy. Chubu Electric devised a strategy to alleviate the concern about nuclear safety and persuaded the town to implement the strategy. The leadership responded by organising groups of local residents to visit other areas, such as Tokai-mura and Mihama, where nuclear power plants were either operating or under construction. At the time, these areas were undergoing rapid development due to the construction of nuclear projects. Moreover, the Tokai-mura nuclear plant had a good safety record. Groups taken on these trips discussed safety and regional development issues with relevant people including personnel from other electric power companies. Finance for these trips was provided by the power company. The ordering of visits was structured from the top levels of society down. Town politicians and officials, heads of **chōnaikai** [Neighbourhood associations], hamlets within the town, and other regional groups, such as housewives and school children, were taken in that order.

The town, in conjunction with Chubu Electric, also held a number of public lectures and visited local residents to discuss safety issues. These activities were not only a way of providing information supportive of the nuclear project. They also allowed the promoters to assess the response patterns of different sections of the community toward the project. Those sections of the community regarded as important were then persuaded to visit power plants in other regions.[35]

This approach was critical in changing community perceptions about the risk and benefits attached to nuclear power. It demonstrated to the community that large-scale benefits would be obtained from the construction of a nuclear power plant. It also convinced the community in Hamaoka that other regions had accepted the risks involved in nuclear projects. During the late 1960s, moreover, the company was

----

35. Interview with personnel in Chubu Electric, 1983.

fortunate in not having to deal with an articulate environmental movement. Emphasis during these years was placed on the expansion of social and economic opportunities and less weight was given to the risk and environmental degradation expected to accrue from energy project developments. Given those societal attitudes, the visits were extremely successful in reducing community concern about nuclear risks and weakening one critical base of the anti-nuclear movement.

Chubu Electric's approach to dealing with the community concern about safety differed from the anti-nuclear movement's approach. Whereas Chubu Electric provided finance and persuaded the town administration to implement its well-structred strategy, the anti-nuclear movement had very little political and administrative support at the local and prefectural level. It was not endowed with finance to take local groups to areas, such as Tsuruga, which had experienced nuclear accidents. The anti-nuclear movement's approach of relying only on lectures, demonstrations and the distribution of pamphlets was countered by the ability of project promoters to use the demonstration effect in a structured way.

Having weakened its opponents, the Chubu Electric Power Company proceeded to make its first offer to land owners, through the town, on 5 February 1968. This offer injected an instability into the settlement process between Chubu Electric and the Sakura hamlet over the distribution of compensation. Non-property right owners argued that they would incur equal risks from the project and yet were receiving no benefits. Land owners were certain to receive actual benefits in the form of compensation once negotiations were complete. Non-property right owners would not receive benefits until construction commenced, and the nature and extent of those benefits was uncertain. These groups argued that they would not receive specific or direct benefits such as compensation, and that there was no guarantee that they would even accrue indirect benefits, such as the expansion of employment opportunities, once project construction commenced.[36]

The town created the **Sakura chiku taisaku kyōgikai** [Sakura Hamlet Policy Committee; hereafter referred to as the Sakura Committee] on the 11 February 1968. This committee, chaired by Kamogawa, considered the demands of groups within the hamlet, and proposed to Chubu Electric that it provide community compensation which would be used to develop the hamlet. This led to the **Sakura kaihatsu ni kansuru yōbō ketsugi** [Resolution of Demands Concerning the Development of the Sakura Region] which was agreed upon by the hamlet and Chubu Electric on 25 October 1968. It covered community compensation for the development of social and economic infrastructure and guaranteed employment opportunities for locals. This strategy had the effect of providing specific benefits to non-property right owners within the hamlet and, therefore, reduced their resistance to the project. Chubu Electric was willing to take into account fully the uneven distribution of costs and benefits across different

----

36. Information obtained from an influential landowner in Sakura hamlet, 1983.

interests in Sakura in the management of compensation policy. The company had failed to do this at Ashihama and it will be recalled that residents in Kisei town opposed the project arguing that they should also receive compensation.

The power company, despite the need to win a quick settlement over the project, wished to delay the actual payment of community compensation until the major part of land negotiations were complete. The company argued the immediate payment of compensation might improve the bargaining position of land owners who might delay the project as a tactic for increasing their demands in relinquishing their property rights. Chubu Electric, therefore, wished to schedule the payment of community compensation and property right transfer arrangements at roughly the same time. The town provided the necessary guarantees to Sakura hamlet that community compensation would, at a later date, be paid. As a interim measure, the town borrowed finance from the prefecture to construct a cultural centre, which was completed on 31 August 1968. This showed the community that actual benefits would result from their acceptance of the project.[37]

Chubu Electric followed its first offer to land owners on 5 February with a second on 10 March 1968. These offers were made through the town but both were rejected by landowners. There remained a difference between what the power company

----

37. Interviews with prefectural and local government officials, 1983.

was prepared to pay and what the landowners were prepared to accept for the relinquishment of their land rights.[38] The power company had based its offer on the 'income derived payment formula' contained in the Compensation Standards.[39] The property right owners based their demands on the 'similar situation derived payment formula' also contained in the Compensation Standards and demanded roughly the same amount as that paid in the settlement between the prefectural government and landowners over the construction of the Tokai Expressway. The landowners in the Tokai Expressway case had received a higher payment than Chubu Electric was initially prepared to pay for the transfer of their property rights.

While these differences reflected the nature of institutionalised property right transfer arrangements, they also partly reflected the different interests of landowners in Sakura hamlet. The cost of losing property rights was not spread evenly amongst landowners, and the motivations of various property right owners differed substantially. The landowners in Sakura can be categorised into four types. The first consisted of those individuals whose land was very unproductive and were willing to sell at a very low price. The second group consisted of farmers specialising in agriculture. These specialist farmers were generally

----

38. For details of the negotiations see **Sankei shinbun** [Sankei Newspaper], **Chunichi shinbun** [Chunichi Newspaper], **Shizuoka shinbun** [Shizuoka Newspaper] and **Shizuoka chunichi shinbun** [Shizuoka Central Newspaper], various issues between March and July, 1968.

39. Refer to Chapter 2 for a fuller description of the Compensation Standards.

opposed to losing their land rights. The third group consisted of landowners who wished to delay the proposal simply to bargain for more payment. The fourth group comprised of individuals who were uncertain as to whether they should sell or not.[40]

The lack of homogeneity amongst land owners provided an opportunity for the leftist anti-nuclear movement, among whom were some farmers, to influence and delay the land negotiations. It was rapidly becoming clear that the implementation of the project would depend largely on the successful acquisition of land by the company. Chubu Electric and the town were very concerned about the possibility that too much delay would affect the negotiations with Sakura hamlet over community compensation. They thought that resistance by non-property right owners in the hamlet might emerge if community compensation, which had been guaranteed by the company, were not delivered quickly.[41]

The town leadership responded to the activities by the anti-nuclear movement by establishing the **Yōchi kōshō iinkai** [Land Negotiation Committee] on 6 May 1968. The head of this committee was Kurebayashi Matsutaro, deputy director of the Sakura Agricultural Co-operative and a close colleague and friend of Kamogawa.[42] This comittee played a crucial role in the land negotiation process. First, it isolated

---

40. Interview with influential landowner in Sakura hamlet, 1983.

41. Information obtained from Chubu Electric, 1982

42. Interview with Chubu Electric and influential landowner in Sakura hamlet, 1983.

the majority of property right owners from the Struggle Committee, and, therefore allowed land owners to rely on the organisation to resolve conflict over the economic valuation of their property. Second, the social decision-making rules of the hamlet, which placed an emphasis on working together for the good of the hamlet as determined by the leadership, allowed Kamogawa and Kurebayashi to influence landowners. Third, it created a unified partner with which the power company could bargain, relatively free from external interference.

Leadership change in the Fishing Alliance

The emergence of the Struggle Committee worried the prefectural government about the possible reaction in the community to concerns about radiation. Yaezu city, in Shizuoka prefecture, was the location where Kubokawa Aiikichi, a telecommunications officer, had died as a result of radiation exposure incurred in the Bikini test in 1954 while on an expedition in the vicinity of the explosion.[43] In Shizuoka, given this historical experience with nuclear weapons, there was a potential for stronger community concern about the risk of radiation than in other regions such as Fukushima and Mihama, where nuclear projects were

----

43. Nihon genshiryoku sangyō kaigi, **Genshiryoku kaihatsu 10-nenshi**, [A Ten Year History of Nuclear Power in Japan], Nihon genshiryoku sangyō kaigi, Tokyo, 1965. See also Lesbirel S.H., **Factors Influencing Long Term Uranium Demand in Japan with Special Reference to Nuclear Siting**, unpublished Honours Thesis, Griffith University, Brisbane, 1980, Chapter 4 for a fuller discussion of the impact of the Bikini tests on the development of the anti-nuclear movement in Japan.

being developed. The struggle Committee attempted to sensitise the prefectural community to the risks of nuclear power.

The prefectural administration also wished to weaken the influence of the leftist movement but could not, however, give the appearance of strongly promoting the nuclear power plant. In 1967, the prefectural administration had tried to pressure local residents in Numazu city to accept an oil combinant. That had resulted in immense resistance by the local community and the prefecture was forced to abandon the project in that same year. The leadership felt that similar tactics might engender local resistance to the project, providing additional stimulus to the Struggle Committee.[44]

The prefecture, therefore, responded politically rather than administratively. On 27 December 1968, the prefectural branch of the LDP established the **Genpatsu tokubetsu iinkai** [Special Nuclear Energy Committee; hereafter referred to as the Special Committee]. This committee, chaired by Sano Kakicki, the Speaker of the Assembly, and consisting of prefectural assemblymen was set up to consider the safety of nuclear power.[45] The Special Committee also had another more important objective. This committee sought to break the nexus between the Fishing Alliance and the leftist anti-nuclear movement. Its major aim was to remove Hata from the leadership of the Fishing Alliance. Given Hata's

----

44. Interviews with Shizuoka prefectural government officials, 1982.

45. Information obtained from a Diet member, House of Representatives, 1983.

ideological position, this appeared to be the only available option in promoting the project. Chubu Electric could not commence negotiations with the fishing co-operatives as the leftist movement could block those negotiations through Hata's position in the fishing co-operative. The strategy consisted of a number of carefully considered steps which had to be portrayed as originating from the local level.

The first step was to establish the **Genpatsu taisaku shingikai** [Omaezaki and Sagara Nuclear Committee; hereafter referred to as the Nuclear Committee].[46] The Nuclear Committee was established on 20 January 1968. It comprised two groups. The first group consisted of local residents from Omaezaki and Sagara towns. The second group comprised members of the five Hainan Fishing Co-operatives. Both groups studied the safety of nuclear energy and the role of nuclear energy in regional development. A major thrust of the policy of the Nuclear Committee was based on conducting the affairs of the region independently of outside leftist influence such as Sōhyō and the JSP.[47]

There was considerable concern amongst decision makers at the local and prefectural level about the possibility of the emergence of resident opposition in Sagara and Omaezaki to

----

46. **Ibid.**

47. See Suzuki H., **Hamaoka genshiryoku hatsuden shō mondai ni kansuru shingikai kaichō chōsa** [Deliberative Council Investigations on Problems Relating to the Hamaoka Nuclear Power Plant], Hamaoka genshiryoku hatsuden sho mondai taisaku shingikai, 1969 and Suzuki H., **Hamaoka genshiryoku hatsuden to watashi tachi no kurashi: sono anzen sei to kangae kata** [The Hamaoka Nuclear Power Plant and Our Lives: Safety and a Way of Approaching Safety Issues], Dennyoku shinpō sha, Tokyo, 1977.

the project. The merits of the project to both these towns were substantially less than those of Hamaoka. Sagara and Omaezaki would not develop as quickly as Hamaoka which could expect a boom in activity once the construction of the power plant was commenced. The risk of the nuclear power plant was, on the other hand, not limited to the administrative boundaries of Hamaoka. There was concern in surrounding areas about the potential environmental effects from the project, particularly on mandarins and **sake** [Japanese rice wine], which were important to the economy of those areas. It was, therefore, necessary to provide a forum whereby decision makers and the community could discuss the safety of nuclear power and the role of the project in regional development. The effect of this move was to forestall potential attempts by the anti-nuclear alliance to recruit local interests in Sagara and Omalyaki to their cause or to lay the ground for the further extension of outside interests from local decision making.[48]

The second step to promote a change of attitudes within the Fishing Alliance. This was done through Yanigahara Seiji, a member of the Special Committee who had important personal connections with Kawaguchi Yuzo, head of the Omaezaki Fishing Co-operative and president of Kawaguchi Tekko, a steel company in Shimizu city, and Haraguchi Inaichi, head of the Jittogata Fishing Co-operative. He persuaded Kawaguchi and Haraguchi to adopt the necessary measures to oust Hata. Yanagihara, while being a prefectural

----

48. Information received from a previous mayor of Sagara, 1983.

assemblyman, owned the Shin Yanagihara Boat Factory in Yoshida, a city neighbouring Sagara to the north. Both Kawaguchi and Haraguchi had been employed in the Shin Yanagihara Boat Factory. Yanagihara provided financial assistance to Kawaguchi in establishing his steel factory. He had also provided political support to Haraguchi in the fishing co-operative elections.[49]

Kawaguchi and Haraguchi were critical in engineering a shift in the attitude of the Fishing Alliance in favour of the project, by appealing to deep-sea fishing groups. The deep sea fishing groups had been giving support to coastal fishermen but this had mainly been a gesture of solidarity. The proposed power plant was unlikely to affect greatly the fortunes of deep sea fishermen. Furthermore, they had been receiving subsidies from the prefectural government for the purpose of constructing port facilities to expand their industry. The perceived costs of not supporting prefectural policies in terms of jeopardising these subsidies was high and allowed Kawaguchi and Haraguchi to use the support of deep sea fishermen to shift the attitude of the Fishing Alliance as a whole.[50]

On 27 March 1968, Kawaguchi and Haraguchi set up the **Genpatsu kenkyū rijikai** [Board of Director's Nuclear Study Deliberative Committee; hereafter referred to as the Director's Committee] which consisted of the Heads of the Five Hainan Fishing Co-operatives. The Director's Committee

----

49. Interviews with officials of the Omaezaki and Sagara Fishing Co-operatives, 1983.

50. Information received from prefectural government officials, 1983.

spent two months in close consultation with the Prefectural Fishing Bureau investigating the major concerns of coastal fishermen. The success of this strategy was reflected in a memorandum published on 27 May 1968.[51] The memorandum stated that the Fishing Alliance would not oppose nuclear energy if it could be proven to be safe and that an independent investigation of the impact of the nuclear proposal on the regional fishing industry should be conducted in conjunction with the Nuclear Committee. This memorandum, therefore, represented a compromise between the concerns of coastal fishermen and the needs of deep sea fishermen to institute an attitudinal change within the Fishing Alliance. This shift in attitude isolated Hata and weakened his position of opposing jointly with leftist elements.

The third step was to oust Hata, as leader of the Fishing Alliance, to install a new leader and finally to bring the Alliance into the Nuclear Committee where it could be isolated from leftist elements. Haraguchi persuaded Nakamoto Ichiro to attempt to change Hata's position on the project. Nakamoto was one of the Directors of the co-operative and had extremely close links with Hata. He had supported Hata through his entire career and was crucial in engineering support for him in fishing co-operative and assembly elections. Nakamoto persuaded Hata to participate

----

51. See Hamaoka genshiryoku hatsuden shō kensetsu hantai gyōmin kyōgikai, **Hamaoka genpatsu ni taisuru gyōmin no toitsu kenkai** [A United Fishermen's View of the Hamaoka Nuclear Power Plant], Sagara, 1968.

in the independent fishing investigation, a proposal arising out of the May 1968 memorandum.[52]

The pressure on Hata from within the Fishing Alliance and within the Sagara co-operative was immense. Given the change of attitudes in the Fishing Alliance, Hata was isolated from the mainstream position which stressed an independent investigation of the impact of waste water on the marine environment, and on 15 August, he was defeated in a general election. Onada Shosaku, a cousin of Kawaguchi, was elected head of the Fishing Alliance. The ousting of Hata effectively broke the nexus between the Fishing Alliance and the leftist anti-nuclear movement.

The Director's Committee was not only a body to investigate the concerns of coastal fishermen; it was also a body designed to start fishing right transfer and compensation arrangements with Chubu Electric. Soon after the publication of the May memorandum, this committee changed its name to the **Genpatsu kankei gyōyō gōdō kaigi** [United Fishermen's Council on Nuclear Energy; hereafter referred to as the Fishermen's Council]. This council, despite continued resistance by coastal fishermen, commenced preliminary negotiations with the Chubu Electric Power Company in March 1968.

The structure of the regional political organisation in Shizuoka was able effectively to weaken the influence of Hata who was the link between the anti-nuclear movement and

----

52. Information obtained from Chubu Electric and a previous mayor of Sagara, 1983.

the Fishing Alliance. Prefectural politicians and other local actors had important relationships with property right owners. The leadership, through these established relationships, was able to oust Hata from his position of influence. In contrast, the political organisation in Mie prefecture did not have the capacity to influence the Nanto Fishing Co-operatives. Certain sections of the leadership, such as Ishihawa who was Head of the Mie Prefectural Fishing Co-operative and Satanoka who was the Speaker of the Assembly had strong relationships with the fishing industry, and took anti-nuclear attitudes. The power company did not have key relationships with leaders who could influence the Nanto co-operative's position toward the project.

National government response and Denchōshin approval

By late 1968, Chubu Electric had reached broad agreement with the Fisherman's Council over the transfer of fishing rights and had obtained approval from the prefectural governor and local mayors for the development of the project. It had, therefore, completed the requirements for submission of the proposal to Denchōshin. By this stage, the power company expected an electricity supply shortage of approximately 1450 MW on five year forecast demand and wished to start construction of the nuclear plant quickly. It argued that further delay would lead to an electricity shortfall in the company's electricity sphere[53] and appealed to the national government to give Denchōshin approval to

----

53. Data compiled by Tokyo Electric and Shigen enerugii chō kōeki jigyo bu, **op.cit.**, 1969.

develop the plant. The national government was receptive to the proposal from Chubu Electric since the supply situation in the Central Electricity Sphere had worsened since 1967 and the government was worried about possible future electricity shortages. In the Central Electricity Sphere, demand had increased 13.1 per cent from 12976 MW in 1967 to 14684 MW in 1968. In 1968, electricity demand was forecast to increase by 20.6 per cent to 20549 MW in 1972.[54] The national government was eager to give approval so that Chubu Electric could commence applying for the necessary permits to construct the project.

Nonetheless, the national government was concerned about continued resistance by the leftist movement and coastal fishermen in Shizuoka. Fishing rights transfer arrangements were still in the negotiating stage and coastal fishermen were still opposing the project. The government remembered very clearly the Nagashima Incident at Ashihama in 1967. It did not want a similiar situation arising with coastal fishermen in Shizuoka. It also thought that formal approval of the Hamaoka project might destabilise property right negotiations. The government was worried, too, that an intensification of opposition by coastal fishermen might cause difficulties during the licensing process when Chubu Electric would be required to receive permits relating to the use of the ocean for transporting components in the construction of the plant.[55]

----

54. **ibid.**

55. Information Obtained from an official of the Economic Planning Agency, 1983.

The national government, however, placed more importance on the risk of potential electricity shortages than on the risk of affecting property right negotiations. On 23 May, it granted conditional Denchōshin approval subject to the satisfactory completion of fishing rights negotiations. This allowed Chubu Electric to commence licensing and preliminary construction while property right transfer arrangements were being simultaneously conducted.[56]

Social value and project delay

The value that project promoters, such as power companies, the regional political organisation and the national government, place on the development of projects in an important element which requires consideration in the assessment of project settlement times. The settlement process at Hamaoka was relatively short because project promoters placed a high priority on the development of the project and because promoters had the ability to weaken effectively a leftist-based resistance movement which emerged.

Chubu Electric and the national government faced a potential supply shortage in the regional electricity sphere. Forecast demand was increasing at a faster rate than the expected development of energy projects. The power company was willing to compensate regional interests and provide

----

56. Information received from Chubu Electric, 1983.

community compensation in return for agreement to the project. The national government gave approval for the project despite continued resistance by some local fishermen and a leftist anti-nuclear movement. The supply situation strongly influenced the approach to reaching a quick settlement at Hamaoka.

The regional government at both the prefectural and local levels placed a high priority on the development of the project. The installation of the nuclear plant was consistent with the prefectural community's expectations about the expansion of future social and economic opportunities, the need to become self-sufficient in electricity generation and the requirement for balanced regional economic development. At the local level, both Hamaoka and surrounding areas were interested in accepting the project to provide a stimulus to their local economies.

The strong prefectural and local government support was an important factor in winning a quick settlement over the development of the project. The political organisation in Shizuoka did assist in establishing a negotiating table at which Chubu Electric and regional interests could negotiate a settlement. It responded quickly to the unexpected emergence of opposition to the project and skillfully facilitated negotiations by weakening the leftist anti-nuclear movement and isolating that movement from the negotiations between Chubu Electric and regional interests. The leadership was involved at all stages of the negotiations over the transfer of land and fishing rights and community compensation arrangements. The power company could, therefore, negotiate an effective settlement with minimal outside interference.

The skill of Chubu Electric was, to a certain extent, important in the settlement process. The power company had learnt from its failure to implement the Ashihama project. The major lesson from that experience was the need to consider the varying impact of projects on different community interests in the effective management of compensation policy. This was clearly reflected in the company's approach to the payment of compensation to non-property right owners in Sakara Hamlet. They opposed the project because they felt that land owners would receive benefits at their expense. Chubu Electric responded quickly and used Kamogawa to assist in the settlement over community compensation.

The weakness of the leftist anti-nuclear movement also allowed the leadership to promote the project. Social and economic attitudes did not place a high priority on the preservation of the environment and the maintenance of nuclear risk-free society; rather they stressed further economic growth. The leftist movement could not successfully sensitise environmental and risk issues to create community opposition to the project. The leftist movement was, in addition, not structured in a way which allowed strong resistance. Leftist prefectural political parties were not willing to jeopardise their relatively strong representation in the prefectural assembly by opposing the project. Consequently, there was a lack of external support for the opposition movement. The movement could not create a base in Hamaoka because of the conservative nature of the town and a community desire to foster economic development.

The major problem for the supporters of the project was to isolate the influence of the anti-nuclear movement from property right owners. In Hamaoka, the influence of Kamogawa was critical in establishing a land negotiation committee. In the Hainan Fishing Co-operative, the skill of Kawaguchi, Haraguchi and Nakamoto was important in ousting Hata from the Fishing Alliance. They appealed to deep sea fisherman who did not expect to be adversely affected by the project. This approach isolated the leftist movement from influencing property right owners.

The ability of project promoters to set up negotiating committees was critical to reaching agreement over the transfer of property rights and compensation arrangements. These committees facilitated negotiations because they effectively isolated property right and other community interests from the influence of the anti-nuclear movement, and allowed the political leadership to influence the negotiating process. The formation of these committees created a relatively unified partner with which Chubu Electric could negotiate with regional interests in a way which minimised outside interference.

The structure of regional politics, personal relations between leaders and the skill of those leaders plays some role in the settlement process between power companies and regional communities. The political organisation in

Shizuoka established a negotiating table at which Chubu Electric could negotiate a settlement with regional interests relatively free from external ideological interference. The skill of that leadership appears to have weakened the leftist anti-nuclear movement and facilitated the settlement process more effectively than in other areas.

The ability to assess public acceptance times that is offered by statistical models developed in Chapter 4, which take into account the distribution of benefits and costs, can be improved to a certain extent by a consideration of the nature of the regional political organisation. In Hamaoka, the analysis of the nature and skill of the political leadership could have provided a marginally better assessment of time required to reach settlement over the project. This finding suggests that, in general, the structure of the regional political organisation is fairly similar at all locations in Japan and therefore is not a critical determinant of the variation in settlement times.

Chapters 5 and 6 have considered the relative importance of interest groups and the social value of projects in the assessment of power plant settlement times. Chapter 7 considers the importance of revised energy policy priorities on the national and regional level on settlement outcomes. Chapter 8 then focusses on the importance of project costs on the willingness of promoters to negotiate settlements over the development energy projects.

THE IMPACT OF REVISED ENERGY POLICY PRIORITIES

Revised energy priorities, which stress national security and regional electricity policy objectives, can be a significant element influencing the ease with which project promoters can negotiate settlements over the development of energy power projects. The revision of energy policy priorities may lead to a national government participating in regional decision-making processes and facilitating a settlement between conflicting interests in the course of settlement. This will be particularly important in situations where project promoters do not have the ability to compensate regional interests unilaterally. The national government can provide compensation and subsidies to affected parties to facilitate the bargaining process.

The Electric Power Development Company (EPDC) won approval to locate the Matsushima coal-fired plant on a small island called Matsushima, located off the coast of Ooseto town in Nagasaki prefecture in 1977. The time taken to reach a settlement was 44.0 months which is a little longer than the average public acceptance time for initial fossil-fuelled plants and approximately half the time required to obtain public acceptance for initial nuclear projects.[1]

The EPDC, like other power companies analysed in this thesis, under-estimated the time required to win approval

----

1. Public acceptance times for initial nuclear and fossil-fuelled power plants are 82.0 and 38.3 months respectively. See Chapter 2.

for the project. Both the predictive and evaluative models developed in Chapter 4 both, on the other hand over-estimated the settlement time by 24 months. The statistical models do not provide a reliable basis upon which the public acceptance time could have been estimated at Matsushima. It is important to explore the reasons why the promoters of the Mutsushima project, given the distribution of expected costs and benefits from the project, were able to reach a settlement effectively and relatively quickly.[2]

The way in which the distribution of benefits and costs fell in the case of the Matsushima project suggests that there would have been a longer than average settlement time for the project. In Kyushu, expected electricity shortages were declining and there was no need to develop quickly additional capacity. Social attitudes also placed more emphasis on the preservation of the environment than on economic growth. Incomes were increasing relatively quickly, but the community was more concerned about of the impairment of the environment that was expected to result from the project. At the same time, leftist political parties placed emphasis on the development of the fossil-fuelled project. The favourable electricity supply and demand situation, however, dominated these other influences and the statistical models suggest that settlement time would have been relatively long.[3]

----

2. Refer to Appendix 2 for a comparison of residuals for the Matsushima project relative to other projects.

3. See Chapter 4 for a fuller analysis of the impact of these influences on the variation in public acceptance times.

The models which consider the impact of these influences on settlement times do not adequately explain the actual time required to reach agreement over the Matsushima project. The statistical analysis fails to allow for the impact of revised energy policy priorities on the settlement process. The accurate assessment of public acceptance times for power stations requires an analysis of the stability of energy policy objectives and the impact of changes in those objectives on bargaining between and amongst promoters and regional interests over the development of those projects.

Although the Nagasaki prefectural community was willing to accept the project, the EPDC faced considerable opposition from Kyushu Electric and the Ministry of Finance (MOF) because of the high expected economic costs of the project. This initially delayed the project. During the course of settlement, the national government, in response to the oil crisis, started to stress the importance of energy security and regional electricity policy objectives. The increased social value of the project allowed the national government to provide subsidies and compensation to affected parties, such as Kyushu Electric and the local community, thus effectively striking an early settlement.

Site selection and regional energy policy

In April 1973, the EPDC began internal evaluation of Matsushima island as a possible location on which to construct a coal-fired power station.[4] Matsushima is a

----

4. Appendix 5 contains a detailed chronology of events in the siting of the Matsushima project.

small island located off Ooseto town in Nagasaki prefecture in Kyushu. The island is part of Ooseto town and lies within the administrative jurisdiction of that town. The EPDC, while not publicising their intention to locate a plant in Matsushima, received considerable support for the project from prefectural officials. The prefecture was eager to develop a coal-fired project in order to sustain high levels of economic growth and to provide an outlet for the ailing coal industry.

The planned location of the project was in Kyushu Electric's electricity sphere. Kyushu Electric opposed the development of the Matsushima project. It argued that there was no electricity supply and demand rationale for adding capacity to the existing grid in Kyushu and that the project would lead to a costly excess capacity situation. It also resisted the EPDC's plan because it felt that the coal project would heighten concern about pollution problems and that this would adversely affect negotiations at other sites being concurrently undertaken by the power company.

EPDC and site selection

The EPDC was established in 1952 amidst a tight electricity supply and demand situation in Japan. It is a public company and 70 per cent of its finance is provided by the national government; the remaining 30 per cent is provided by the nine electric power companies.[5] The EPDC, unlike the nine electric power companies, does not supply electricity

----

5. Information received from personnel of the EPDC in 1983

directly to industrial and residential users. It assists the electric power industry in meeting electricity supply objectives in situations where shortfalls are expected to occur. The EPDC, therefore, acts as a public insurance company aimed at reducing the risk of electricity shortages in Japan.

Up until the late 1950s, the EPDC developed mainly hydro-electric power stations. By this time, large-scale hydro-electric sites had become exhausted and the power company expanded its role in national energy policy, starting to develop coal-fired plants. It subsequently became a major pillar in the national government's policy of supporting the domestic coal industry. The EPDC developed coal-fired projects and provided an outlet for domestic coal from Hokkaido and Kyushu, the two major coal producing areas in Japan.[6]

Coal was the major form of energy used in Japan in the immediate post-war period. In the mid 1950s, however, large discoveries of oil in the Middle East reduced the relative price of oil. At that stage, the Japanese economy was starting to show signs of rapid economic growth. The national government saw a cheap oil supply as a necessary condition for continued economic growth. Although there was strong opposition by the coal industry, it adopted a policy of importing oil from the Middle East. It provided subsidies to Japanese oil companies and developed taxation policies conducive to expanding the use of oil in the

----

6. Information received from the EPDC, 1983.

Japanese economy. In response to these market and policy incentives, the power industry substituted out of coal into oil.[7] In the course of Japan's rapid economic development, coal production declined from 52.6 million tonnes in 1960 to 20.9 million tonnes in 1973. The number of operating mines also declined noticably from 622 in 1960 to 37 in 1973.[8]

The decline in the use of coal did not take place without social costs. It created employment problems in coal producing areas. While aggregate employment consequences were not large, there were some adjustment problems particularly in Hokkaido and Kyushu, the two major coal producing regions in Japan. Maintenance of the coal industry became an important social and economic policy priority in those areas.

In response to adjustment problems in the coal industry, the national government developed a coal policy, with the aim of subsidising the use of domestic coal and thus restraining, to a certain extent, the declining use of coal. Between 1953 and 1972, the government formulated five such coal policies, each of which aimed to set production targets for coal. These production targets, however, were never met, largely because of the unwillingness of the power and

----

7. See Ikuta T., 'Japan Energy Policies', **Enerugii keizai** [Energy Economics], Vol. 9, October 1984, pp.9-11.

8. See Shigen enerugii chō, **Sōgō enerugii tōkei** [Energy Statistics] Shigen enerugii chō, various issues, 1960-1974.

industrial sectors to consume relatively more expensive coal.[9]

By the early 1970s, the situation in coal producing areas had deteriorated and, in June 1972, the government announced its fifth coal policy which set the coal production target at 20 million tonnes. This fifth coal policy differed from previous policies in that consumption targets were also established. The nine electric power companies were asked to consume a total of 3.5 million tonnes of coal in the period 1973-78. The EPDC would consume approximately 3 million tonnes. Other industries, such as the steel industry, were asked to purchase 11 million tonnes. The EPDC, therefore, was expected to become the largest consumer of coal in the power industry.[10]

Unlike the nine electric power companies, the EPDC does not possess a specific regional sphere to which it supplies electricity exclusively. As noted earlier, it supplies electricity to the nine electric power companies and other public utilities. In principle, the company is able to site power plants anywhere in Japan. General site selection criteria, such as the availability of cooling water, apply to projects developed by the EPDC.[11] Criteria for public

----

9. For a brief summary of the contents, objectives and target and actual coal production levels, see Hokkaido shōkō kankyō bu, **Hokkaido enerugii gaiyō** [Energy in Hokkaido] Hokkaido shōko kankyō bu, Hokkaido, 1983, pp.154-57.

10. **ibid.**

11. See Chapter 2 a fuller discussion of site selection criteria in the development of power plants in Japan.

acceptance of EPDC's projects, however, differ from those applying to other power companies. In addition to general criteria, such as agreement by local mayors, prefectural governors and property right owners, the EPDC must also obtain consent from the relevant power company which is operating in the area where the project development will take place.[12]

The EPDC had sited coal-fired plants in Kanagawa, Hyogo and Hiroshima prefectures. The company decided to attempt location in Hokkaido or Kyushu. The cost of transporting coal from these two areas particularly to plants in Honshu had been a factor in the escalation of the cost of electricity generated by coal-fired plants. In order to improve the competitiveness of coal projects, the EPDC felt that it was necessary to minimise transport costs by locating projects as close as possible to coal producing areas.[13]

Although the two major candidate prefectures were Hokkaido and Kyushu, the EPDC assessed that it would be difficult to develop a fossil-fuelled project in Hokkaido. During the early 1970s, the Ministry of International Trade and Industry (MITI) and the Hokkaido government were already putting considerable pressure on Hokkaido Electric to develop a coal-fired plant to increase the demand for

----

12. Information received from the EPDC, 1983.

13. ibid.

domestic coal in Hokkaido.[14] Hokkaido Electric itself was confronted with substantial opposition to its Kyowa-Tomari nuclear project from local fishing co-operatives and an ideologically based anti-nuclear movement, as will be discussed in the next chapter. The company decided to postpone the nuclear project and develop the Tokoma-Atsuma coal-fired and the Date oil-fired projects. The development of the Tokoma-Atsuma and Date plants and the subsequent development of the Kyowa-Tomari nuclear project was expected to place Hokkaido Electric in a favourable electricity supply and demand situation. Accordingly, MITI persuaded the EPDC not to attempt location of a coal-fired project in Hokkaido.

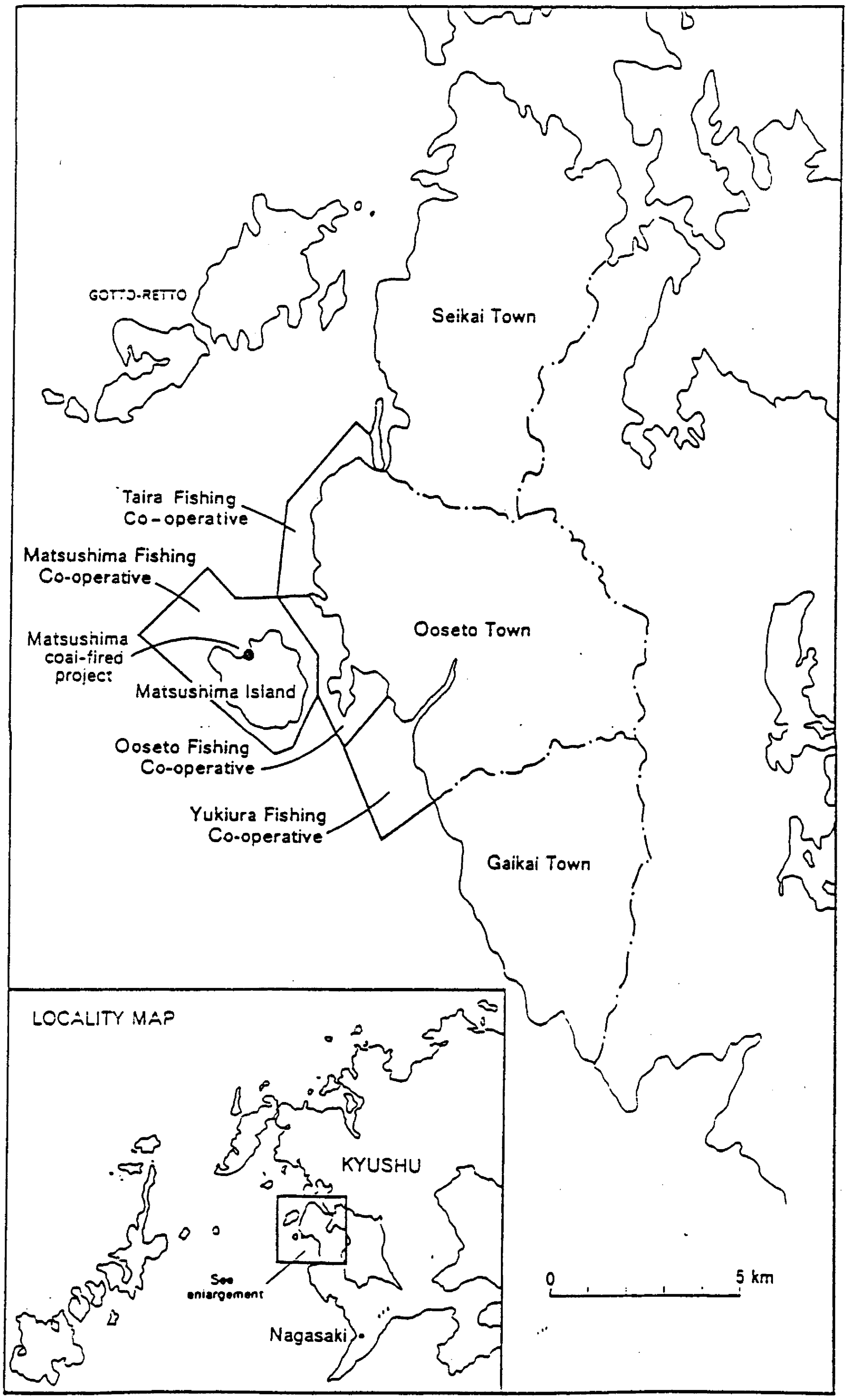
The EPDC subsequently focussed its attention on Kyushu and started site selection investigations in early 1973. These investigations revealed a suitable site at a small hamlet called Uchiura on Matsushima island off the coast of Ooseto town. Map 7.1 illustrates the location of the project and surrounding areas and the structure of property rights. There was a deep port which would allow access by vessels transporting coal and there was, therefore, no need to construct a costly port. There was adequate land on which a coal-fired project could be developed. Seventy per cent of

----

14. See Igarashi T., **Kojima ni dekita hatsuden shō: denpatsu matsushima sekitan karyoku** [The Power Plant That was Constructed on a Small Island: The Matsushima Coal-fired Plant], Nikkei jigyō, Tokyo, 1982 pp.7-13. Igarushi's book provides a wealth of information on the dispute over the Matsushima project. The analysis is, however, very descriptive and focusses on the social responsibility of the EPDC in the siting of the project. It should be noted that the funding for the research was provided by the EPDC.

MAP 7.1

LOCATION OF MATSUSHIMA COAL-FIRED PROJECT AND STRUCTURE OF PROPERTY RIGHT OWNERSHIP



this land was owned by Matsushima Kosan, a company which had developed coal mines on a number of Nagasaki's offshore islands. The area had a relatively low population density. Furthermore, Matsushima island was located approximately midway between Nagasaki and Sasebo and relatively close to Kyushu Electric's transmission network which serviced those areas. The cost of setting up a transmission network to feed into Kyushu Electric's grid was not, therefore, expected to be high.[15]

Community and power company response

In June 1973, the EPDC announced that it would reach agreement with the community in Kyushu within approximately 20 months.[16] The power company felt that it could win support for the project from the Nagasaki government and the local community because of a strong interest in the development of coal projects. The EPDC also knew that it would have to negotiate with Kyushu Electric to construct site and the project before MOF would be willing to provide project development finance. The assessment of 20 months reflected the expected difficulties in negotiating with Kyushu Electric over the development of the project.

The EPDC devised a strategy for bargaining with Kyushu Electric. It attempted to create local and prefectural support for the project and to persuade regional interests,

----

15. Information obtained in discussions with personnel from the EPDC, 1983.

16. ibid.

such as the prefectural government, to appeal to MITI and MOF to accept the project. It felt that regional and national government support for the project would weaken Kyushu Electric's opposition to the project. This strategy had a considerable measure of success on the regional level, but Kyushu Electric was in a strong bargaining position and was able to persuade MOF that the project was uneconomical.

Community response

The EPDC set out to create regional support for the project. In February 1973, after discussions with EPDC officials, the **Nagasaki ken tankyō shichōson rengōkai** [Nagasaki Regional Liaison Committee for the Coal Industry; hereafter referred as the Liaison Committee] expressed an interest in the development of a coal-fired project. This committee consisted of local mayors from coal producing areas and was a powerful lobby group in Kyushu. It was concerned about the local employment consequences of the declining use of coal in Kyushu. The Liaison Committee sent petitions to a number of local governments, which included Ooseto town, requesting them to consider their areas as possible locations for a project. In April that year, the committee also sent a request to MITI and the Kyushu branch of MITI requesting co-operation in the location of a project.[17]

----

17. Ishikawa S., **Sekitan senkō karyoku hatsuden shō no kensetsu ni taisuru yōbōsho** [Community Demands Regarding the Development of the Matsushima fossil-fuelled Plant], Nagasaki ken tangyō shichōson rengō kai, Nagasaki, 1973.

The prefectural government also took positive action in supporting the project. Incomes in Nagasaki were growing at an average annual rate of 12.1 per cent and this was much higher than an average of 7.8 per cent for other areas accepting fossil-fuelled projects.[18] A major finding in Chapter 4 was that fossil-fuelled projects have longer leadtimes in prefectures where incomes are growing relatively rapidly. The community in those areas places more weight on the physical environmental impairment attached to fossil-fuelled projects and less on the expansion of income generated by those projects. The Nagasaki government, however, responded favourably toward the development of coal-fired projects because they could be expected to assist the ailing coal industry. The attainment of regional coal policy objectives, therefore, overcame the concern about the quality of the environment in Nagasaki. This is one important element in explaining why the statistical models developed in this thesis over-estimate the time required to reach agreement of the Matsushima project.

In June 1973, Governor Kubo sent a request to MOF and other relevant ministries, such as the MITI, to obtain finance for the development of the project. The request contained five reasons justifying finance for the project. The first was the devastating economic impact of mine closures in local coal producing areas. The second was the need to guarantee

----

18. Calculated from data contained in Asahi shinbun sha, **Asahi nenkan** [Asahi Yearbook], Asahi shinbun sha, various issues, 1969-1974.

a stable demand for domestic coal for social policy reasons. The third was the need to develop coal-fired plants for the long-term economic viability of the coal industry. The fourth was the need to maintain employment of the 25000 people engaged in the industry. The fifth was the need to stabilise the coal industry to contribute to regional economic development.[19]

There was no reference to the electricity supply and demand situation in Kyushu in the appeals by the Liaison Committee and the prefecture to the national government. The project was not seen in terms of prefectural energy policy. Nagasaki prefecture was in a favourable electricity situation. From 1970 to 1973, electricity self-sufficiency had increased in Nagasaki from 122 to 161 per cent and the prefecture was a net exporter of electricity to other areas in Kyushu.[20] Regional interests, therefore, attempted to promote the project in the context of regional industrial policy. They saw the project as playing a role in facilitating the recovery of the coal industry in Kyushu.

Power company response

Despite the strong support by the community in Nagasaki prefecture, the Kyushu Electric Power Company opposed the

----

19. See Kubo S., **Sekitan senkō karyoku hatsuden shō kensetsu ni kansuru yōbōshō** [Demands Regarding the Construction of the Matsushima Coal-fired Project], Nagasaki, 1973.

20. Nihon enerugii keizai kenkyūjō, **Chiiki betsu enerugii juyō tokusei no bunseki** [Characteristics of Energy Supply and Demand in Japan by Prefecture], Nihon enerugii keizai kenkyūjō, Tokyo, 1980.

development of the plant.[21] Kyushu Electric was uncertain about the economic costs of the EPDC project given a favourable expected electricity supply and demand situation in Kyushu. It was also worried about the impact of the project on the scheduling of its site development plans. This uncertainty was exacerbated because Kyushu Electric perceived that it would have no control over the speed of development of the project.

In 1973, there was no urgency in the development of a coal-fired project to supplement the existing grid in Kyushu. The company argued that the Matsushima project would lead to excess capacity. In that year, actual supply by Kyushu Electric was 5716 Megawatts (MW) and five year projections indicated that electricity demand would increase to approximately 8210 MW. Kyushu Electric, however, had substantial capacity in the licensing stage and under construction. This capacity included the Sendai and Buzen fossil-fuelled plants and the Genkai nuclear plant and totalled 2974 MW. This implied that the power company expected to be in a favourable position with respect to electricity supply in the period 1973 to 1978.[22]

---

21. This section on Kyushu Electric's response to the Matsushima project is based on extensive interviews with personnel of the Kyushu Electric Power Company, 1983 and various issues of **Yomiuri shinbun** [Yomiuri Newspaper], **Nagasaki shinbun** [Nagasaki Newspaper,] and **Nikkan kōgyō shinbun** [Nikkan Industrial Newspaper], 17-18 May 1974, and Igarashi T., **op.cit.**, pp.68-74.

22. Information received from the Tokyo Electric Power Company, 1984 and Shigen enerugii chō kōeki jigyō bu, **Dengen kaihatsu no gaiyō: sono keikaku to kisō shiryō** [An Outline of Power Plant Developments in Japan: Plans and Basic Data], Tokyo, various issues, 1965-1982.

The structure of the electricity grid in Kyushu also influenced Kyushu Electric's response to the project. As the grid was interconnected with the Honshu grid only by a small transmission line, Kyushu Electric argued that it would not be possible to distribute any excess capacity to the mainland. Kyushu Electric felt that it would be pressured by the EPDC to purchase the bulk of electricity generated by the project. The company did not wish to be put in a position of having to purchase costly excess electricity which it could generate more cheaply itself.

The company also argued that there would be no stability in the supply of local coal to the project. Coal mines had been closing down rapidly in Kyushu and efforts to use imported steaming coal to assure security of supply would be rejected by the coal industry. Furthermore, Kyushu Electric had previously experienced such coal supply problems and, as a result, had been forced to modify a number of existing coal-fired plants so that they could burn a combination of oil and coal fuels. The cost of such design changes were relatively high, compared with the cost of initially developing an oil-fired plant.

Kyushu Electric was also worried about the impact of the Matsushima project on electricity tariffs in Kyushu. The price of coal produced in Kyushu was high relative to that of imported oil. Even with government subsidies, the price of coal had been increasing in Kyushu. The major element in the escalation of the price was the increased scarcity of surface coal. The coal industry had entered into deeper underground coal bodies and this had increased the extraction cost. The higher cost of coal was a major factor leading to higher electricity prices in Kyushu and, by the early 1970s, electricity tariffs were the highest in Japan. As fuel costs are a major component of the total costs of coal-fired plants, Kyushu Electric was concerned that the development of a coal-fired plant would put further upward pressure on electricity prices.

There were also environmental considerations. Coal produced in Kyushu has a high sulphur content, and Kyushu Electric was concerned about the environmental impact of the Matsushima plant on Ooseto town. It argued that the project might lead to the emergence of strong local environmental resistance to the project as Ooseto town had a relatively high population density. It felt that the development of the project would stimulate and intensify anti-pollution movements which had been emerging in Kyushu since the early 1970s. Kyushu Electric felt that this would increase the difficulty of siting power projects elsewhere in Kyushu.

As the Matsushima project was expected to lead to an excess supply situation, Kyushu Electric also saw a high cost in the necessary rescheduling of its project development plans. The rescheduling of projects was expected to lead to negotiating problems with local communities, where the leadership had created support for projects by fostering expectations about the expansion income and employment Kyushu Electric was concerned that delay in delivering those benefits might result in public opposition to its projects.

The power company was also worried about the cost of delaying projects in the construction stage. Kyushu Electric was borrowing heavily to finance the Genkai nuclear project and delay would have increased the repayment burden. In the early 1970s, inflation had increased and this was also expected to add to the construction cost of the projects should they be excessively delayed.

Kyushu Electric also disapproved of the project because of strong parochial and territorial feelings. Since the late 1960s, there had emerged a trend among the larger power companies to develop projects in the electricity spheres of other smaller power companies. Site availability for large power companies had become limited because of strong urban environmental resistance and competing uses for land. Large power companies began to consider sites in more rural areas where smaller electric power companies were operating. Tokyo Electric had developed the Fukushima nuclear project and was developing the Kashiwazaki-Kariwa nuclear project in Tohoku Electric's sphere. Kansai Electric had also developed the Oi, Mihama and Fukui nuclear projects in Hokuriku Electric's sphere. Kyushu Electric felt that large power companies from Tokyo and Osaka should not be developing scarce rural sites at the expense of smaller power companies.

Kyushu Electric, therefore, opposed the project because it faced a choice between the high costs of both excess capacity and the rescheduling site management plans. Its response to the EPDC project differs significantly from the responses of other power companies in similar situations such as those in Honshu. For example, Hokuriku Electric did not oppose the development of Kansai Electric's Mihama and Oi nuclear projects. The grid beetwen Hokuriku and Kansai was interconnected thus allowing excess electricity from those projects to be transferred to Kansai Electric. In addition, Hokuriku Electic was having major difficulties in locating the Noto nuclear power plant.[23] It saw major benefits in Kansai Electric's projects as it would be able to purchase cheaper electricity when necessary.

Kyushu Electric was in a strong bargaining position with the EPDC. The cost of the Matsushima project was high and Kyushu Electric appealed to MOF not to support uneconomical projects. Furthermore, the negotiation process between the EPDC and the Nagasaki prefectural government and Ooseto local government, on the one hand, and the prefecture and MOF, on the other, was being conducted secretly at this stage. Both the prefecture and EPDC perceived that resistance in Ooseto town might emerge if it were revealed that the prefecture, the EPDC and MOF had been negotiating over the development of the project without their knowledge of it. The EPDC decided to delay the project and not pressure Kyushu Electric into publicising the dispute.

----

23. See Nagashu shinbun sha, **Jinmin shōri no kiroku** [Records of the People's Victory], Nagashu shinbun sha, Shimonoseki, 1978 for a detailed analysis of the dispute over the siting of the Noto nuclear power plant.

Revised energy priorities and project development

In October 1973, the oil crisis occurred and there emerged a strong interest in Japan in the development of alternative energy sources, such as coal, to enhance energy security. The oil crisis had a major impact on the negotiations over the Matsushima project. It put the EPDC in a stronger bargaining position with Kyushu Electric and the company decided to seek agreement from the regional community to conduct an Environmental Assessment and proceed with negotiations over the project development.

The EPDC and revised energy priorities

The 1973 oil crisis caused considerable concern in the national government and power companies over the future price and availability of oil supplies. The national government revised its existing energy policy and aimed to reduce dependence on imported oil. A major pillar in the new energy policy was the development of alternative energy sources such as nuclear, coal and LNG projects. The national government, therefore, came to place considerable importance on the speedy development of the Matsushima project.[24]

The EPDC's place in national energy policy expanded from the peripheral social role of providing an outlet for the domestic coal in Japan to an important role as a major developer of coal-fired projects to reduce Japan's

----

24. **Denki shinbun** [Electricity Newspaper], 4 October 1974.

vulnerability to oil supply interruptions. This role was reflected in the EPDC's five year plan which was announced on 13 March 1974. In that plan, the company announced that it would develop three coal-fired plants, one of which would be the Matsushima project.

The importance of the development of coal-fired plants was enhanced because of expected delays in the development of nuclear power projects. Many of Japan's nuclear projects had encountered stiff regional opposition and, as a result, nuclear power plant leadtimes were showing noticeable increases. The national government placed high importance on the development of nuclear projects, but the expected delays meant that they could only play a role in the longer term in reducing dependence on imported oil. Coal-fired projects were expected to have shorter gestation times and, therefore, were seen as a major source of electricity until nuclear projects could be brought on stream.[25]

Despite the change in energy policy priorities, the EPDC still had to start negotiatons with regional interests, such as the prefectural government, the local community in Ooseto, and Kyushu Electric as well as the national government, in order to obtain the necessary funds to develop the project. In March 1974, the company announced that it wished to start construction by mid-1975. As the national budget is passed annually in January, the EPDC attempted to negotiate simultaneously with the community in Ooseto town, Kyushu Electric and the national government.

----

25. **Asahi shinmbun** [Asahi Newspaper], 13 March 1974.

The company judged that in order to commence construction in mid-1975, it would be required to obtain Denchōshin approval by late 1974, thus leaving approximately six months to obtain appropriate licenses and permits. This implied that the EPDC was allowing approximately one and a half years to win approval for the project.[26]

Environmental Assessment

In February 1974, the EPDC applied to the Nagasaki prefectural government for the necessary permits to conduct an Environmental Assessment. The prefecture was only too eager to give the company permission to commence the assessment. Since the oil crisis the prefecture had intensified its support for the project. Nagasaki prefecture was particularly hard hit by the recession after the oil crisis. The world wide recession caused major adjustment problems for the ship-building industry which had been a major pillar in the prefecture's economy. The prefectural government was, therefore, very interested in the development of the Matsushima project to stimulate regional economic growth.

The prefecture did not wish environmental opposition to emerge in Ooseto town and consequently it placed three conditions on the conduct of the Environmental Assessment as it related to the EPDC's siting policy at Matsushima. The first was that the company was required to publicise all

----

26. Information obtained in an interview with personnel from the EPDC, 1983.

results of the investigation. The second was that the project would be abandoned if the results of the investigation indicated that there would be an adverse impact on the physical environment in Ooseto town and in surrounding areas. The third condition state that the company would not start land, fishing right transfer and community compensation negotiations until after the assessment had been completed and publicised.

The EPDC promised, publicly, to abide by these conditions and, therefore, attempted to separate the environmental investigation from the actual construction of the project. That is to say, the company wanted to be perceived to be not promoting the project until after the investigation had revealed that the project was sound environmentally. The EPDC also wanted to minimise the local concern about the environmental impact of project. Furthermore, it could not start the formal negotiations with the community until it had received approval from Kyushu Electric and MOF on the construction of the plant. The company felt that the emergence of resistance to the project would destabilize negotiations it was planning to conduct concurrently with Kyushu Electric and MOF.[27]

Regional community response

The Ooseto town assembly agreed formally to the Environmental Assessment in July 1974. In mid-1973, the EPDC had approached mayor Nagata about the possiblity of

----

27. See Igarashi T., **op.cit.**, pp.38-57 and information received from officials of the Environmental Planning Agency, 1983.

developing the coal-fired plant on Matsushima Island. Nagata felt that the local community would readily accept the project. The EPDC, however, wished to delay publicising their intention to develop the project because of opposition by Kyushu Electric. The power company persuaded Nagata to keep the project proposal secret.

At the local level, too, the oil crisis had raised hopes for a resumption of the project. The mayor, Nagata, sought to promote the project by creating local support for the project. His strategy was to create expectations for regional development by proposing the construction of a paper pulp project. Such a project was less environmentally obstrusive and Nagata felt that he could create a consensus quickly. He planned to change the proposal to a coal-fired project after a development mood had been created in the town. Nagata had the view that the community would be less worried about the environmental implications of the project if there was a strong push for regional development in the town.[28]

Nagata persuaded local residents from Uchiura hamlet on Matsushima island to promote the paper pulp project. On the 5 January 1974, thirty-six residents from Uchiura sent a request to Nagata urging him to support the development of a paper pulp project. The assembly subsequently formed the **Kigyō yūchi tokubetsu iinkai** [Special Committee for Inviting the Development of Industry; hereafter referred to as the

----

28. Information received from a journalist who reported the developments in the siting of the Matsushima project, 1983.

Special Committee] which was to consider the development of the paper pulp project. The Special Committee, while considering the paper pulp project, attempted to create a development mood amongst residents living on the island. The town assembly supported unanimously the development of the paper pulp project and this was critical in stimulating an interest in regional development.[29]

Subsequently, the committee abandoned the paper pulp project and proposed a coal-fired project. As expected by the leadership, this change in plan was received with enthusiasm from island residents. There was little prospect for regional development in Matsushima. During the Taisho period, Matsushima island was a major coal producing area, and the island economy was highly dependent on the mining industry. Approximately 15000 people had been employed in that industry. In 1934, however, a flash flood forced the closure of the largest mine on the island and, by 1963, the other smaller mines were exhausted.[30] As there was no other industry which could absorb the workforce, many young people started to leave the island in search of employment opportunities. The community in Matsushima felt that the development of a project would stimulate the island economy and that young people would return to the island.[31]

----

29. Interviews with personnel in the EPDC, 1983.

30. Omi K., eds., 'Matsushima sekitan karyoku hatsuden shō richi o kaerimiru' [Reflecting on the Development of the Matsushima Coal-fired Plant], **Denpatsu** [The EPDC Bulletin], Dengen kaihatsu kabushiki gaisha, Tokyo, January 1978, p.18.

31. Honma U., 'Machi ni waka tachi ga kaette kita' [The Youth have Returned], **Enerugii Fuoramu** [Energy Forum], Tokyo, February 1981, pp.67-70.

Matsushima also lagged in the development of social and economic infrastructure. The outflow of young people had led to an ageing population and there was a severe shortage of welfare services. There were no hospitals and the only means of transportation to mainland hospitals was by a dilapidated ferry which operated only once or twice a week. On numerous occasions, elderly people had failed to receive medical treatment because of a lack of clinics and transportation to hospitals on the mainland. The lack of welfare services had become a major social issue amongst the island community.[32]

As noted in Chapter 2, the national government established the Three Laws in 1974. These laws provide finance for the development of public goods, such as hospitals, to communities accepting power plants. In his discussions with local residents in Matsushima, Nagata stressed that these benefits would accrue to the island community. The local public, therefore, saw the coal-fired project as a means of achieving the expansion of welfare services for the aged. At the same time, there was some concern about the environmental cost associated with the development of the coal-fired project. The community, however, was not overly worried about the impairment of the environment resulting from the project. As the island had been historically a mining area, there was a high degree of familiarity with environmental problems associated with coal use. The community in Matsushima was willing to accept the

----

32. Information obtained from a journalist covering the siting of the Matsushima project, 1983.

environmental risks in return for the social and economic benefits expected from the project development.

On the mainland, there was also strong community support for the project. Ooseto had been left behind the rest of the prefecture in economic development and this had caused major financial difficulties. From 1965 to 1973, the town's financial index declined from 0.20 to 0.16.[33] The town anticipated that there would be substantial financial, income and employment benefits from accepting the project. Moreover, the environmental costs were perceived to be concentrated mainly on the island. The geographical location of the project was also important in the mainland community's support. The community expected to receive substantial benefits from the construction of the project yet the costs were to be borne predominantly by the community on Matsushima island.

On 20 May, the EPDC explained the details of the project to the four fishing co-operatives in Ooseto town. They were the Matsushima, Ooseto, Taira and Yukiura Fishing Co-operatives. Maekawa Hidekatsu, head of the Yukiura Fishing Co-operative and speaker of the town assembly played an important role in winning agreement for the Environmental Assessment from fishermen. There was little coastal fishing conducted near Matsushima and the majority of fishermen were engaged in off-shore fishing. Maekawa argued that waste

----

33. Jichi shō zaisei kyoku shidō ka, **Shichōson betsu kessan jōkyō shirabe** [An Examination of Local Financial Accounts], Jichi shō zaisei kyoku shidō ka, various issues, 1965-74.

water discharged from the project would not affect fishing and that the co-operatives should allow the Environmental Assessment to take place so that any adverse effects could be identified. Despite some concern about the impact of waste water on the marine environment, the fishing co-operatives gave their consent to the Environmental Assessment on 27 July 1974.[34]

An important characteristic of the community response at both the local and prefectural level was the lack of organised economic resistance toward the project. This differs from other nuclear and fossil-fuelled siting disputes where resistance generally emerged in the initial stages of project development. The community in Ooseto attached importance to the benefits, such as the provision of public goods and the recovery of the coal industry, expected to accrue from the project. It placed less emphasis on the environmental risk associated with coal because of the familiarity with coal mining operations.

A second feature of the dispute was the lack of ideological resistance to the project. One major conclusion of Chapter 4 was that nuclear project leadtimes tend to be longer in areas where there is a relatively high representation of leftist political parties in the prefectural assembly. In Nagasaki, there was bipartisan support of the project. Both the Liberal Democratic Party and the Japan Socialist Party, the two major parties in Nagasaki, saw the project as an

----

34. See Igarashi T., **op.cit.** pp.98-104.

integral part of the prefecture's industrial policy which was aimed at expanding the demand for coal produced in Nagasaki. In contrast to other areas, economic and ideological resistance toward the power plant did not emerge.

Bargaining between promoters

The oil crisis, together with the expected electricity shortages in the Western Electricity Sphere, increased the importance of the project to the EPDC and MITI. Kyushu Electric, however, still opposed the project because of the high cost of excess capacity in Kyushu. MOF was also reluctant to provide the necessary finance because of a macro-economic policy objective of curtailing public expenditure to curb inflationary trends in the Japanese economy. The EPDC and MITI had a strong bargaining position given the emphasis on energy security. They were able to reach a settlement by proposing the development of transmission lines which would interconnect the Kyushu and Honshu grids. This enhanced the economic viability of the project and alleviated Kyushu Electric's concern about excess capacity in Kyushu. The agreement by Kyushu Electric isolated MOF. The EPDC subsequently used Diet members to exert pressure on MOF to incorporate the project into the national government budget.

Negotiations between power companies

As soon as the EPDC obtained community consent to undertake the Environmental Assessment, the Kyushu Electric Power

Company began to oppose the project publically. The public opposition by Kyushu Electric was a reflection of its eroded bargaining position vis-à-vis the promoters of the project. Since the oil crisis, the economic justification for opposing the project had weakened. The costs of coal-fired plants were now lower relative to oil and there was the added concern about energy security. Coal projects became an economically viable option for diversifying away from oil and the national government relaxed coal import restrictions to enhance security of supply.[35]

Despite the concern about energy security, Kyushu Electric saw no need to develop the project. Between 1973 and 1974, Kyushu Electric's supply capacity increased by 8 per cent from 5716 MW to 6175 MW. During the same period, demand had increased by only 4 per cent from 5378 MW to 5553 MW. The expected recession arising out of higher oil prices, caused a revision in five year electricity demand projections. These were cut back by 1.8 per cent from 8,210 MW in 1973 to 8060 MW in 1974. In response to recessed demand, supply targets were also revised downward from 9735 MW to 9271 MW.

Although Kyushu Electric expected to be in a favourable supply situation, the Western Electricity Sphere which comprises Kyushu, Chugoku and Shikoku Electric Power Companies expected electricity shortfalls. In the Western Electricity Sphere, five year electricity demand projections were revised downward by 2.9 per cent from 19600 MW in 1973

----

35. See **Tokyo shinbun** [Tokyo Newspaper], 19 April 1974.

to 19020 MW in 1974 due to the post-oil crisis recession. Despite these revisions, supply capacity, particularly in the Chugoku Electric sphere, had not kept pace with electricity demand increases. This led to an expected supply shortage for the western sphere. In 1974, actual supply in the sphere was 14623 MW. Expected demand for 1979 was 19620 MW. The three companies in the sphere had capacity totalling approximately 3525 MW which could be expected to come on stream within the five year period. This implied that, if no additional plants were brought on stream by 1979, there would be an electricity shortfall of approximately 850 MW. The Matsushima project was therefore more important in equilibrating the electric market in the western sphere as a whole than in Kyushu Electric's sphere.[36]

Up until early 1974, the EPDC had been negotiating bilaterally with Kyushu Electric over the construction of the Matsushima project. The EPDC decided that, given the different excess supply situations in Kyushu and in the Western Electricity Sphere, it would develop transmission lines to the mainland and use the project to supply the electricity from Kyushu to other power companies in the western sphere. The EPDC decided to discuss the project in regional electricity policy terms and persuaded Chugoku and

----

36. The figures for this analysis were calculated from information received from the Tokyo Electric Power Company and Shigen enerugii chō kōeki jigyo bu, **op.cit.**, various issues, 1973-1974.

Shikoku Electric Power companies to exert pressure on Kyushu Electric to accept the project.[37]

From early 1974, the **Nishi chiiki denryoku kyōgi kai** [Western Electricity Sphere Deliberative Council; hereafter referred to as the Electricity Council] met several times to discuss the Matsushima project. The EPDC, by appealing to the Electricity Council and discussing the benefits of the project in a regional context, was able to weaken the resistance by the Kyushu Electric Power Company to the project. The Chugoku and Shikoku Electric Power Companies were eager to accept the Matsushima project. They could not economically develop large projects because of the relatively small size of their grids. They, therefore, weighed highly the benefits of being able to purchase electricity from Kyushu in order to meet expected electricity shortages. They would also incur no costs, such as compensation, necessary to implement the project. The EPDC and the Chugoku and Shikoku Electric Power Companies were thus able to focus on the regional benefits of the project, and exert pressure on Kyushu Electric by arguing that the company should be giving priority to broader regional interests rather than narrow sectoral company interests.[38]

Existing transmission lines were only capable of distributing small amounts of electricity from Kyushu. As a result, two major issues had to be resolved in the context

----

37. Interviews with personnel of the EPDC, 1983.

38. Information received from personnel of Chugoku and Shikoku Electric Power Companies, 1983.

of negotiations over the development of transmission lines to the mainland. The first involved the number of plants the EPDC would construct and the proportion of electricity each of the three private companies would take from the Matsushima project. The second was the proportion each company should pay for the construction of the transmission lines.[39]

In September 1974, the Electricity Council agreed on the construction of a single coal-fired plant. The EPDC had wished to obtain agreement for two projects, but Kyushu Electric had argued that one project would be sufficient to meet supply objectives in the western sphere. The Council agreed that the EPDC would only build one project at this time, and that a future proposal for a additional plant should be considered in the light of subsequent regional electricity supply and demand considerations.

The Matsushima project had a capacity of 500 MW and each of the three private companies agreed to contract with the EPDC over the up-take of electricity generated by the plant. The up-take quantities were based on the need for electricity and the size of respective grids. Although Chugoku Electric had a smaller grid, it agreed to take a 40 per cent share because of its greater need to purchase electricity. Kyushu Electric also agreed to take 40 per cent because its grid

----

39. For various analyses of the dispute, see **Denki shinbun** [Electric Newspaper], 21-25 September 1974, **Nihon keizai shinbun** [Japan Economic Newspaper], 20-22 September 1974, **Nikkan kōgyō shinbun** [Nikkan Industrial Newspaper], 21 September 1974 and **Nishi nihon shinbun** [West Japan Newspaper], 20 September 1974.

was the largest in the western sphere. Shikoku Electric had both a smaller grid and less of a need to purchase electricity and, therefore, agreed to purchase the remaining 20 per cent.

The expected cost of developing the electricity distribution network was approximately 11700 million yen. This included new transmission lines and extensions and renovations to existing lines. Chugoku Electric and the EPDC agreed to finance the major part of the cost involved in constructing transmission lines. Chugoku Electric agreed to pay 4600 million yen for the development of transmission lines through Hiroshima and Okayama prefectures. The EPDC agreed to provide 6100 million yen for all other major transmission lines necessary to complete the distribution network in the Western Electricity Sphere.[40]

The costs of the transmission lines were charged against the project development. The benefits of the Matsushima project, in terms of energy security and regional electricity concerns, outweighed these costs and, therefore, increased the social value of the project. The EPDC was able to reach agreement with Kyushu Electric by providing benefits to the company for accepting the project. Together with Chugoku Electric it provided indirect compensation to Kyushu Electric by subsidising the development of the transmission network between Kyushu and the mainland. The

----

40. See Matsushima richi jimushō, **Matsushima karyoku hatsuden shō kensetsu keikaku: keii to genjō** [The Construction of the Mutsushima Power Plant: Details and the Present Situation], Dengen kaihatsu kabushiki gaisha, Tokyo, 1977, p.5.

transmission network reduced the potential for an excess supply situation. Furthermore, it improved substantially the reliability of the grid in the sphere and reduced the risk of shortages in the event of plant malfunctions and unexpected increases in electricity demand. Kyushu Electric incurred no costs for the increased reliability of the grid.

Project financing and inter-ministry conflict

By October 1974, the EPDC had developed substantial regional support for the project. It had also reached agreement with the Kyushu Electric Power Company over the construction of the Matsushima project. It had commenced the Environmental Assessment and planned to complete that in the latter half of 1975. The company appeared to be in a good position to appeal to MOF to incorporate the project into the national government budget and obtain the necessary funds to compensate the community and then construct the project.

The EPDC appealed to MITI to promote the project. MITI's Public Utility Bureau was interested in the project because of a concern about energy security. It had played a major role in the development of Japan's energy policy and was critical in the formulation of Japan's policy of diversifying away from oil after the 1973 crisis. The Coal Bureau which is located in the Agency for Natural Resources and Energy (ANDRE) also promoted the project because of its desire to provide outlets for domestically produced coal. The coincidence of interests between these two bureaus allowed MITI and ANDRE to present a united front in attempting to persuade MOF to accept the project.[41]

The Budget Bureau in MOF, however, took a more cautious stance toward the project. In accordance with Prime Minister Miki's economic policy objectives, the ministry was attempting to formulate a budget which reduced the national deficit by restraining public spending. One of Miki's major economic priorities was to reduce the budget deficit in order to curb spiralling inflation after the oil crisis. Among other things, he sought to restrain government spending so that aggregate demand in the economy could be reduced. MOF saw the Matsushima project as one impediment to the attainment of macro-economic policy goals.[42]

In late 1974, the EPDC requested MOF to provide finance in order to compensate the community so that a settlement could be reached. It asked for 200 million yen for the Environmental Assessment and the other preliminary investigations, and for negotiations over the transfer of property rights and community compensation arrangements.[43] A necessary criterion for receiving a budget to construct the project was agreement with the regional electorate over the development of the project. The company thought that obtaining this negotiation budget would allow the commencement of community negotiations after the completion

----

41. Information obtained from MITI, 1983.

42. Interview with officials from MOF, 1983.

43. **Nihon keizai shinbun** [Japan Economic Newspaper], 13 January 1975.

of the Environmental Assessment and the company would, therefore, be able to present MOF with a proposal to construct the plant in the latter half of 1975 for the 1976 budget.

MOF argued that it would be politically risky to provide finance for compensation given that the Environmental Assessment had not been completed. It noted the conditions that the prefecture had placed upon the completion of the Environmental Assessment and community negotiations. It argued that the provision of a negotiation budget prior to the completion of the Environmental Assessment would lead to opposition by environmental groups at the national level and might create resistance to the Matsushima project at the local level. MOF, therefore, did not approve the subsidy for the Environmental Assessment and other investigations.[44]

MOF's decision placed the EPDC in an unfavourable position with respect to the commencement of negotiations with the local community. It did not wish to wait until the 1976 budget as this would delay project implementation. MITI however, stepped into the breach by providing a subsidy to the EPDC so that the company could start negotiations. This allowed the company to conduct community compensation and property right transfer negotiations during 1975.

By late 1975, the EPDC had prepared a proposal for a number of projects to be incorporated into the 1976 budget. These included the Matsushima project as well as the development

----

44. See Igarashi T., **op.cit.**, pp.74-80.

of High Temperature Gas Reactor (HTGR). The company requested a total budget of 7750 million yen, of which 820 million yen was for the Matsushima project and 900 million yen was for the construction of transmission lines. However, MOF was only prepared to provide 4030 million yen. Although the company had 1030 million yen in equity capital, MOF's proposal left the EPDC approximately 2700 million yen below its budget request. This meant that the power company would not be able to develop both projects and would have to choose between the development of the HTGR or the Matsushima project.[45]

MITI responded by arguing that the Matsushima project was important in simultaneously attaining national policy priorities such as energy security and domestic coal policy. It stressed that energy security considerations were paramount and that investment by the electric power industry would contribute, significantly, to regional economic development and recovery. After the oil crisis, Nagasaki prefecture experienced a severe depression. In addition to problems in the coal industry, the prefecture's other main industrial pillar, the shipbuilding industry, had been hit hard by the recession. MITI and the prefecture, therefore, exerted considerable pressure on MOF to provide the necessary budget for the Matsushima project.

The EPDC also appealed to national dietmen to support the project. They persuaded both LDP and JSP members of the

----

45. See **Denki shinbun** [Electricity Newspaper], **Nikkan Kogyō shinbun** [Nikkan Industrial Newspaper] and **Nihon keizai shinbun** [Japan Economic Newspaper], 7 January 1976.

House of Representatives to stimulate discussion in the national diet. The debate in the Diet centred on the importance of energy security. Many of the members argued that, given siting difficulties, it was odd for MOF to reject projects particularly when regional communities were supporting them vigorously. There was bipartisan support for the project on the national level and this exerted considerable pressure on MOF to accept the project.[46] Under this pressure, MOF agreed in January 1976, to finance the Matsushima project. The EPDC was successful in reaching agreement with Kyushu Electric over the development of the project and then persuading MITI and the Diet to pressure MOF into accepting the Matsushima coal-fired plant. The company skilfully created substantial support for the project and this weakened MOF's position. Energy security and regional electricity and industrial policy objectives outweighed budgetary objectives in the development of the project.

Compensating regional communities

This impressive success at the national level, however, brought the EPDC difficulties in its bargaining with the Ooseto community over the project. The EPDC had completed the Environmented Assessment, but had not published the results. Furthermore, since the middle of 1975, the company had been conducting land transfer investigations which, in the community mind, presumed that the project would go

----

46. See **Nihon keizai shinbun** [Japan Economic Newspaper], 13 December 1975, and information obtained from MITI, 1983.

ahead. The negotiations between MOF and the power company over project finance were, therefore, seen by some segments of the community as breaking the company's promise of waiting for the community's response to the results of the Environmental Assessment. It injected instabilities into the settlement process on the local level.[47]

Some community interests, such as residents on Matsushima island, responded by opposing the project so as to improve their bargaining positions with the EPDC. They knew that the EPDC would receive subsidies from the national government for the development of the project and wished to extract a share of those subsidies. Although there were benefits, such as the provision of public goods from the Three Laws, some community interests wished to receive compensation directly from the EPDC in return for their agreement for the project. They justified their positions by arguing that the company broke its promise over the conduct of the Environmental Assessment.

In September 1975, a group led by Kamoura Fusahiko, an influential resident of Uchiura, formed the **Seikatsu kyōgi kai** [Life Deliberative Council].[48] Kamoura was a leader of a small group of residents in Uchiura. He had been a fisherman but after his father's death left the island and attempted to study architecture. Not doing so well at this,

----

47. Igarashi T., **op.cit.**, pp.80-91 and interviews with personnel from the EPDC, 1983.

48. See Matsushima richi jimushō, **op. cit.**, p.24 and Igarashi T., **op.cit.**, pp.109-111.

he decided to return to Matsushima and, while engaging in some farming, lived a 'Robinson Crusoe' style of existence in an abandoned mine owned by Matsushima Kosan. Kamoura and five other people had signed contracts with Matsushima Kosan allowing them to live in the area where the plant was now being proposed. After 1969 the company had not renewed these contracts but had allowed Kamoura and a few other people to remain living in the area. Kamoura was upset with the EPDC. He had helped company officials conduct surveys in the early part of 1974. From the middle of 1975, company officials had started to enter what he regarded as his land and conduct land transfer investigations without his consent. He knew that the EPDC would have to negotiate with him to reach a settlement and wished to extract as much compensation out of the company as possible.[49]

The opposition by Kamoura was also important in changing the attitude by local residents in Matsushima. They also wanted to receive a share of the benefits of the project and felt that they could bargain with the power company to receive community compensation. They argued that they would incur all the environmental costs of the project while communities in Kyushu, Honshu and Shikoku would be receiving all the benefits.[50]

The fishing co-operatives in Ooseto town, while not developing any organised opposition movement against the

----

49. Interview with journalist covering the siting of the Matsushima project.

50. Information obtained from personnel of the EPDC, 1983.

project, placed requests with the power company demanding adequate compensation. A major conclusion of the Environmental Assessment was that waste water discharged from the project would affect some coastal fishing. Fishermen knew the power company required their consent to constructing the project and attempted to improve their bargaining position vis-à-vis the EPDC.[51]

The EPDC as well as the town was worried that these changes in community expectations might lead to intense bargaining among various groupings to increase their respective shares of compensation. A further concern was that this bargaining might lead to the emergence of opposition movements against the project as the company could not satisfy all the competing compensation claims. The EPDC responded by conducting a series of discussions in Ooseto to ascertain community attitudes and demands. These investigations revealed that the community in Matsushima and the fishing co-operatives were in favour of the project provided that their welfare, as they perceived it, would be enhanced by the development of the project. This implied obtaining adequate compensation.

The EPDC, in conjunction with the town, devised a strategy to obtain community approval for the project by using the provisions of the Three Laws. They felt that the community approach to compensation would restrain the emergence of any opposition to the project. The negotiations commenced in February 1976. The EPDC and the town negotiated with the

----

51. See Matsushima richi jimushō, **op.cit.**, pp.22-32.

four villages which had been amalgamated to form Ooseto town. These were Ooseto, Matsushima, Yukiura and Taira villages. They also negotiated with the fishing co-operatives to provide funds for the development of the fishing industry.[52]

The town and the EPDC proposed a plan which was aimed at providing benefits to the community in general. The initial plan envisaged a substantial proportion of community compensation going to Ooseto town as a whole (27.9 per cent) and to Ooseto village (27.2 per cent). The relatively large share that was proposed for Ooseto village reflected the population of the village and its proximity to the Matsushima project. In contrast, Matsushima and the fishing industry were to receive 14.1 per cent and 8.6 per cent of community compensation respectively. The town felt that these two sectors of the community would receive substantial benefits from the project with the transfer of their property rights. The remainder of the community compensation was to be directed to the Yukiura and Taira areas.

The initial plan, while attempting to provide general community compensation, did not reflect the allocation of bargaining power within the town. Matsushima and the fishing co-operatives had strong bargaining positions with the EPDC, and they used their positions to increase the share of community compensation at the expense of the town community. These negotiations continued until September.

----

52. Information received from MITI, 1983.

Although the overall amount of compensation did not change, town compensation declined from 17.4 per cent to 10.5 per cent. Compensation to the Ooseto area declined from 27.3 per cent to zero per cent. In contrast, Matsushima's share increased by 22.7 per cent to 37.2 per cent. Fishing development compensation increased by 28.2 per cent to 36.8 per cent. Matsushima and the fishing co-operatives, therefore, were to receive 73.6 per cent of community compensation in return for their support for the project. The share of compensation going to the Yukiura and Taira areas declined marginally.[53]

The EPDC also influenced community expectations by providing direct funds for the additional development of social infrastructure and changing the design of the project. The additional compensation increased the benefits of the project. The power company decided to build a clinic as sick and elderly people had to go to the mainland for treatment. It also agreed to build a public hall on Matsushima island. During negotiations with the locals, the EPDC was persuaded to construct a ferry terminal so access to and from the island would be easier. In addition to those benefits, the company also announced a policy of employing half of the construction workforce from the local population.[54]

----

53. Information contained in a document entitled **Matsushima jiten shūhen chiiki seibi kōfukin haibun** [The Distribution of Compensation for the Development of Public Facilities in Ooseto], collated by the EPDC, 1987.

54. See Dengen kaihatsu kabushiki gaisha, **Matsushima denpatsu kensetsu ni taisuru matsushima chiiku jūmin no jōken yōbō**, [Community Demands and Conditions Regarding the Matsushima Coal-fired Plant], 1976.

A number of changes were also made to the design of the project so as to reduce the impact of the plant on the environment. The risk of accidents between ocean going vessels and fishing boats was perceived to increase with the increase of large vessels entering the Uchiura port. As the port in Uchiura was expected to become quite congested with ocean going coal vessels, the EPDC agreed to build a substitute port for fishermen at a nearby area. The company decided to shorten the length of the breakwater from 650 metres to 550 metres. This provided a better escape route for fishermen using the port in the event of an accident between large coal vessels and fishing boats. The design of the waste water outlet pipes was also changed. The initial construction plan envisaged the outlet pipe pointing to the west. As the Matsushima Fishing Co-operative used the area to the west of the island for coastal fishing, the outlet pipe was changed to point to the east.[55]

While concluding the community compensation negotiations, the EPDC was negotiating simultaneously with landowners. Kamoura's opposition destabilised the land negotiating process. He attempted to persuade other land owners not to sell their land or to demand large payment in return for the transfer of land rights. In order to isolate the majority of landowners from Kamoura the EPDC persuaded the town to form the **Chikensha iinkai** [Landowners Committee] in June 1976. The company felt that this would facilitate land negotiations as Kamoura's influence would be weakened.

----

55. See Matsushima richi jimushō, **op.cit.**, p.12.

Persistent opposition by Kamoura prevented the committee from acting as a single negotiating body and, in July, the committee decided to increase the price for land transfer. The prefecture as well as the town and the EPDC had visited Kamoura on several occasions to persuade him to accept the project. He continually opposed it. In response, the EPDC decided to negotiate individually with landowners and during July and August completed successfully the major part of land transfer negotiations.[56]

On 10 October 1976, the EPDC started negotiations with the fishing co-operatives in Ooseto town. The power company made offers to the fishing co-operatives based on the Compensation Standards. It offered 420 million yen to the Matsushima Fishing Co-operative, 98 million yen to the Taira Fishing Co-operative and 75 million yen to the Yukiura Fishing Co-operative. Although the fishing co-operatives had given their approval to the project, these offers were rejected as being too low. The fishing co-operatives perceived that their bargaining positions were enhanced because the EPDC had just about finalised other compensation and land right transfer negotiations. They felt that they could demand large amounts of payment as failure to win their approval would substantially delay or even cause abandonment of the project.[57]

Despite the emergence of problems regarding the finer details of property right transfer arrangements, the EPDC

----

56. Interview with personnel from the EPDC, 1983.

57. Igarashi T., **op.cit.**, pp.118-124 and pp.145-153.

wished to submit the proposal to Denchōshin by December.[58] Failure to do so would delay the project by a further six months until the Denchōshin committee convened again. It also wanted to obtain national government approval of the project before the next budget was passed in January 1977, as MOF might revise its earlier decision to finance the project. The prefecture as well as mayor Nagata assessed that adequate community approval had been reached although some land transfer and fishing right transfer negotiations were still being conducted. On 17 December, the town assembly gave permission for the project to be submitted to Denchōshin. A week later the prefectural government approved the project and, in late December, Denchōshin approval for the Matsushima project was given.

Revised energy priorities and project delay

The revision of energy priorities is an important element in assessing the speed at which settlements can be reached between promoters and regional interests over the development of energy projects. Changed energy policy objectives, which stress energy security and regional electricity policy objectives can increase the expected value of projects. This will enhance the willingness of promoters, such as the national government, to compensate parties adversely affected by projects development. Revised

----

58. See **Denki shinbun** [Electricity Newspaper], 26 July 1976, **Nihon keizai shinbun: Kyushu ban** [Japan Economic Newspaper: Kyushu Edition], 19 November 1975 and **Nishi nihon shinbun** [Western Japan Newspaper], 28 December 1976 for a discussion of the events leading up to Denchōshin approval for the Matsushima project.

energy policy objective can, therefore, facilitate the settlement process.

In the settlement over the development of the Matsushima project, the EPDC faced considerable opposition by the Kyushu Electric Power Company. The EPDC valued the project in terms of regional coal policy objectives, as it was a major pillar in the government's policy of supporting the coal industry by providing outlets for domestic coal. Kyushu Electric viewed the project in electricity supply and demand terms. It expected a favourable electricity situation and assessed the costs of the project relatively highly. There was a substantial disparity in the value of the project between the EPDC and Kyushu Electric.

The EPDC required Kyushu Electric's consent to develop the project. Kyushu Electric expected the project to lead to a costly excess supply situation in Kyushu. The regional electricity grid was not interconnected with the Honshu grid and it did not want to be put in a position of having to purchase relatively costly electricity from the EPDC. Kyushu Electric was also concerned that it would have to reschedule its existing site development plans and did not wish to incur the site management costs involved in such rescheduling.

The community in Nagasaki promoted the project because of the importance of the coal industry to the regional economy. Like the EPDC, the prefecture valued the project in domestic coal policy terms. The decline in the use of coal was causing problems, such as unemployment, in the regional economy. The prefectural government felt that the construction and operation of the project would facilitate the attainment of important social and economic policy objectives.

There was relatively little concern about the environmental implications of the project on either prefectural or local levels. During the settlement process, there was a strong emphasis being placed on preservation of the environment and improved welfare. This attitude differed in Nagasaki prefecture. The prefecture was historically a coal producing area and there was, therefore, a familiarity with the risk involved in the use of coal. Perhaps more important was the fact that the project was located on Matsushima island. This locational characteristic meant that any impairment of the immediate environment would be concentrated in one area away from population centres.

Another salient feature of the settlement over the development of the Matsushima project was the lack of organised ideological resistance. Both the LDP and the JSP wished to see the development of the project as it would assist the ailing coal industry in Nagasaki. This situation constrasts markedly with the siting of nuclear power stations. Ideological resistance generally emerges in the development of nuclear projects.

The EPDC required a budget from the national government to develop the project. Although the regional electorate supported the project and appealed to MOF to provide the necessary finance, Kyushu Electric's bargaining position was relatively stronger. It appealed to MOF not to allow the development of costly energy projects. MOF was not willing to provide finance for inefficient projects. Economics dominated regional politics in the determination of MOF's stance on the project.

The oil crisis of 1973 and an expected electricity shortage in the Western Electricity Sphere added a new dimension to bargaining over the Matsushima project. It increased the expected benefits of the plant in terms of enhancing energy security and averting electricity shortfalls. These revised expectations placed the EPDC in a much stronger bargaining position with respect to Kyushu Electric and MOF and the power company skilfully weakened their resistance to the project. It stressed the regional interest in the project in terms of averting electricity supply shortfalls in the Western Electricity Sphere and persuaded Shikoku and Chugoku electric power companies to exert pressure on Kyushu Electric to accept the project. A key element in the negotiations was the EPDC's proposal to develop and finance transmission lines to Honshu. This strategy reduced the concern about an excess supply situation in Kyushu. It also enhanced the longer term reliability of the grid in the Western Electricity Sphere and this was also expected to benefit Kyushu Electric. The EPDC, by assuring the provision of the major proportion of development finance, was able to compensate Kyushu Electric for losses expected to be incurred from the project development.

After the oil crisis, the EPDC also persuaded MITI and the national diet to exert pressure on MOF to provide finance for the project. MOF showed a lack of willingness in supporting the project. The Budget Bureau stressed the need to restrain public exenditure to curb inflation in Japan. MITI and the ANDRE were, however, concerned with developing alternative sources of energy and fostering the regional coal industry in Nagasaki. The importance placed on energy security and regional industrial policy objectives outweighed macro-economic considerations in the budgetary process and MOF agreed on financing the project.

The budgetary negotiations on the national level injected instabilities into the settlement process on the local level. Community interests sought to improve their bargaining positions so as to extract as much compensation out of the EPDC as possible. The EPDC and the town used skilfully the provisions of the Three Laws, which provide funds for public goods, to negotiate a settlement with the community in Ooseto town. Other interests, such as Kamoura and fishing co-operatives, attempted to demand large amounts of payment from the EPDC. These interests were not large and powerful and could not rely on ideological resistance to enhance their bargaining positions.

The dispute over the siting of the Matsushima coal-fired project highlights the importance of revised energy policy priorities on the time required to win approval over the development of energy projects in Japan. An analysis of energy priorities on both the national and regional levels appears to be important in improving the reliability of statistical models which assume that preferences remain stable during the negotiating period.

There is a trend in Japan for larger power companies, such as the EPDC and Tokyo Electric, to locate projects in the electricity spheres of other smaller power companies. In these situations the settlement process will require agreement from smaller companies in addition to regional interests. It will, therefore, be necessary to consider the responses of those smaller companies in the assessment of settlement times. Energy demand growth in Japan has slowed down and it is likely that smaller companies will see the development of projects as leading to costly excess capacity. Consequently, they are likely to resist such proposals. At the same time, recent energy policy has started to give more stress to economic efficiency considerations. The national government is not likely to provide strong support for these projects unless there is renewed concern about energy security.

This chapter has considered the importance of revised energy policy priorities in the assessment of settlement times. The following chapter illustrates a case where a power company intentionally delayed the siting of a nuclear project because the costs of the project were high and were expected to increase. The power company preferred to meet electricity supply objectives by giving priority to an alternative less costly fossil-fuelled project.

8

THE IMPEDIMENT OF RISING PROJECT COSTS

The economic cost of projects is an important factor influencing the settlement process between promoters and regional communities over the development of energy projects. Power companies may not be willing to enter into negotiations over compensation and property right transfer arrangements with regional interests in situations where project costs are high and are expected to increase. Under these circumstances, project developers will prefer to delay costly projects intentionally and to give priority to the development of less costly alternatives to meet capacity expansion targets.

The Hokkaido Electric Power Company obtained Denchoshin approval to construct the Kyowa-Tomari nuclear project in 1982, 156 months after it had approached and asked the Hokkaido government to accept the project. The settlement process was one of the longest in Japan and took 86 months longer than the average time to reach agreement over the installation of nuclear projects.[1] The siting dispute at Kyowa-Tomari is important in the context of the assessment of project settlement times in Japan. Despite resistance by fishing co-operatives and an anti-nuclear movement to the project, Hokkaido Electric intentionally delayed negotiating with local interests because relatively low expected electricity demand growth did not justify the cost of the project.

----

1. Refer to Chapter 2.

After 1973, Japan entered a period of recessed energy demand growth. Economic growth slowed down considerably and higher energy prices and strong conservation efforts by government curtailed the expansion of energy demand. Changes in the structure of the economy away from energy intensive to less energy intensive industries also played an important role in reducing the speed of energy demand growth. The recessed growth in demand has reduced the need to develop energy projects quickly. Power companies, on numerous occasions, have preferred to delay project implementation because of the high cost of too much excess capacity. The siting dispute over the Kyowa-Tomari nuclear project provides important insights into the assessment of the times required to locate and construct energy projects.

Hokkaido Electric assessed that it would reach agreement with the local community in Hokkaido in approximately 40 months. The public acceptance time for the project was 168 months and the power company thus under-estimated the approval time for the project by 128 months. The siting models developed in Chapter Four provide a better basis on which the settlement time could have been assessed. The predictive model under-estimates the public acceptance time by 46 months. In contrast, the evaluative model which also takes into account social and economic conditions during the course of settlement, under-estimates the public acceptance time by 25 months. The evaluative model, provides a more accurate assessment of the time required to reach agreement over the project.

The statistical models would have suggested that the settlement time at Kyowa-Tomari would be longer than average. Electricity demand, in both the national and power company electricity spheres, was increasing at a relatively slow rate and there was no powerful electricity market justification for developing the project. Incomes in Hokkaido were growing at a slow rate compared with the rest of Japan and there was no strong development push for the project. In Japan, pollution problems emerged in the late 1960's and early 1970's and regional communities started to place a higher priority on preservation of the environment and improved welfare.[2]

Statistical models which incorporate these influences under-estimate the time required to develop the project. This suggests that there were other influences impeding the negotiation process. The most important of these factors was the unexpectedly high cost of the project. Electricity demand did not grow as quickly as expected and the installation of the project was expected to lead to a costly excess supply situation. Furthermore, the development of a large project to obtain economies of scale was also perceived as likely to reduce the reliability of the grid in Hokkaido. Nor did the power company foresee the relatively large compensation claims by local fishing interests which, if paid, would have reduced the economic viability of the project. The design of the project, moreover, opened the possibility of a successful terrorist attack, and there was

----

2. Refer to Chapter 4 for a fuller analysis of the impact of these influences on the variation in settlement times.

concern that this would reduce the ability to manage the operation of the project effectively. These factors increased the cost of the Kyowa-Tomari project and the power company responded by developing less costly fossil-fuelled projects to meet electricity supply objectives.

Minimising economic cost in site selection

On 29 September 1969, the Hokkaido Electric Power Company, together with the Hokkaido government and the Sapporo branch of the Ministry of International Trade and Industry (MITI), decided officially to develop the Kyowa-Tomari nuclear power plant.[3] The company's siting plan stated that the nuclear reactor would be located in Kyowa town and that the waste water pipes would stretch underground from the town through Tomari village to that village's coastline. The company projected that it would start construction in 1973 and commence commercial operations in 1977.[4] This implied that the power company was aiming to reach a settlement with the local community in Kyowa town and Tomari village within a three to four year period. The relatively long planning horizon was directly attributable to the power company's motivation for developing the project. Hokkaido Electric saw the project as a technology research project and did not see it as an economically viable option for balancing electricity supply and demand in Hokkaido.[5]

----

3. Appendix 6 contains a detailed chronology of events on the siting of the Kyowa-Tomari nuclear project.

4. **Denki shinbun** [Electricity Newspaper], 31 March 1969.

5. **Hokkaido shinbun** [Hokkaido Newspaper], 28 June 1969.

MITI, in an effort to promote nuclear energy in Hokkaido, had been considering candidate sites since 1967, and had offered subsidies to the Hokkaido Electric Power Company within an established framework of providing subsidies for nuclear power development. The power company was eager to develop a nuclear project. Other power companies, such as Tokyo, Kansai and Chubu Electric, were pushing forward with nuclear energy and Hokkaido Electric was concerned at being left behind in the development of nuclear technology. A major incentive for the promotion of the project was to be seen to be developing a nuclear project so as to obtain national government subsidies.[6] Top management within the company regarded the project as a research project involving nuclear technology.

In the late 1960s, there was no supply-demand justification for developing a nuclear plant in Hokkaido. In 1970, the power company estimated that electricity demand in the following five year period would increase to 2230 MW. Installed capacity at that time was 1694 MW and the power company had an additional 1200 MW in the licensing stage and under construction. The company, therefore, expected to have an over-supply of approximately 560 MW by 1975. The speedy development of the Kyowa-Tomari plant (350 MW) would have put the company in a position of having costly excess capacity in the range of 910 MW, or approximately 40 per

----

6. It will be recalled from Chapter 5, which analysed the siting dispute over the Ashihama project, that Chubu Electric was also competing for subsidies from the national government to develop nuclear energy.

cent more capacity than was required based on forecast demand.[7]

Nuclear energy was not competitive with other forms of energy in Hokkaido, such as coal-fired and hydro-electric power. The expected size of the grid was relatively small,[8] preventing the company from developing a large scale plant and reaping economies of scale. Furthermore, the grid in Hokkaido was interconnected with the Honshu grid only by a small transmission line. The company would thus be unable to sell excess electricity from a large plant to consumption centres in Honshu. Given the size of the grid any major project would supply a large proportion of Hokkaido's electricity supply, and it was pointed out that this would reduce the reliability of the grid in the event of an accident at that project.[9]

The power company, in order to improve the competitiveness of nuclear energy, sought to minimise the construction cost of the project as much as feasible. The selection of the Kyowa-Tomari site reflected an assessment of the economic

----

7. Information received from the Tokyo Electric Power Company, 1984 and Shigen enerugii chō kōeki jigyō bu, **Dengen kaihatsu no gaiyo:‾ sono keikaku to kisō shiryō** [An Outline of Power Plant Development in Japan: Plans and Basic Data], Tokyo, 1971.

8. **Hokkaido shinbun** [Hokkaido Newspaper], 28 June 1969.

9. Information obtained from the Hokkaido Electric Power Company, 1983.

costs involved in developing the project.[10] In 1968, MITI and the Hokkaido government had selected Tomari village and Hamaeki village as the most suitable candidate sites. During 1967 and 1968, Hokkaido Electric had also been conducting independent site selection investigations at Kyowa village.

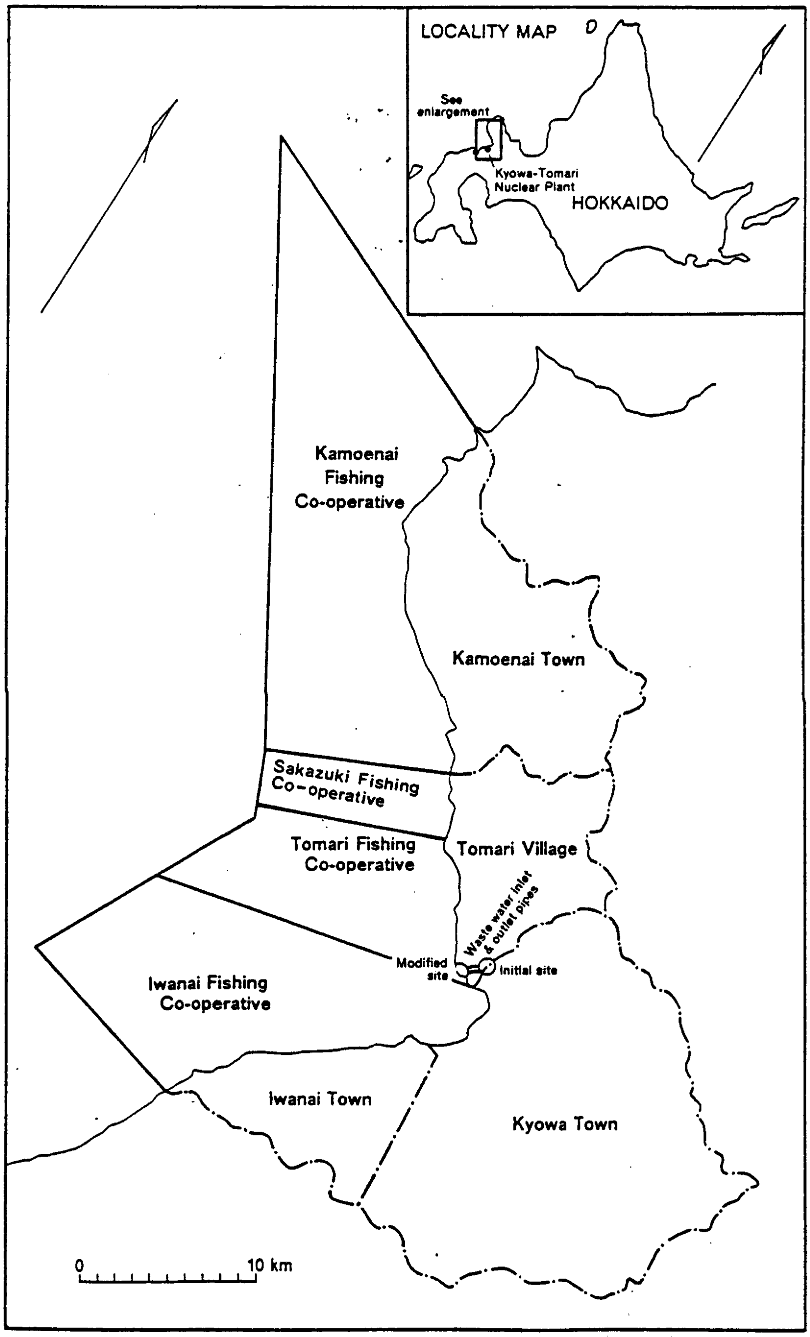
Although there were some political considerations, economic factors were dominant in the selection of the Kyowa-Tomari site. Map 8.1 illustrates the proposed location of the project, the structure of property right ownership and surrounding areas. It also shows Hokkaido Electric's siting plan after 1978 when the power company decided to change the location of the project. Hamaeki village was too far away from major electricity consumption areas in central Hokkaido, and development of a plant in that village would have required the construction of expensive transmission lines and costly improvements to existing port facilities. The Kyowa and Tomari sites were closer to consumption areas, but location in Tomari would have required substantial excavation. The Kyowa site, although two kilometres inland, offered a less costly siting package than the other two areas. The town, acting as the agent of the power company, had already purchased the land on which to build the plant. The land required no excavation and was located close to a

----

10. This section on the selection of the Kyowa-Tomari site was based on the following newspaper articles: **Nihon keizai shinbun: hokkaido ban** [Japan Economic Newspaper: Hokkaido Edition], **Nikkan kōgyō shinbun** [Japan Industrial Newspaper], **Hokkaido taimuzu** [Hokkaido Times], **Asahi shimbun: hokkaido ban** [Asahi Newspaper: Hokkaido Edition], and **Hokkaido shinbun** [Hokkaido Newspaper], various issues, 29-30 September 1969 and interviews with personnel from Hokkaido Electric 1983.

MAP 8.1

LOCATION OF KYOWA-TOMARI NUCLEAR PLANT AND
STRUCTURE OF PROPERTY RIGHT OWNERSHIP



major highway which was to be used as a transportation route to and from the large port in Iwanai, located to the south of Kyowa town.

While the containment vessel housing the reactor was to be placed in Kyowa town, the company did not wish to lay cooling water pipes directly to the south west, the most direct route to the ocean because of anticipated resistance by farmers. Farmers in Kyowa town used the Karifuto river as a source of water, and the power company expected that opposition to the project would emerge within the farming community. Those farmers had water usage rights and would be concerned about the potential effects of a decline in the availability of river water and the discharge of cooling water on agricultural production.

The power company decided to lay the cooling water inlet and outlet pipes underground through Tomari village to the ocean. Tomari had been promoting the project and this project design, although never before contemplated in Japan, would allow the village to receive fixed asset taxes and other compensation for providing the land for the underground pipes. The company felt that this would mitigate any resistance from Tomari village which might arise if Kyowa town were to receive all the benefits from the project at the former's expense. Hokkaido Electric's design strategy enabled the benefits expected from the project to be more evenly distributed than if the project had been solely located in Kyowa.

Rescheduling project development

On 30 September 1969, Kyowa village, Tomari village and Iwanai town signed memorandums with Hokkaido Electric promising co-operation in siting the Kyowa-Tomari nuclear plant. Despite strong administrative and political support for the project, powerful economic resistance, centring on the Iwanai Fishing Co-operative and a more broadly leftist based anti-nuclear movement emerged. The fishing co-operative and the anti-nuclear movement were particularly concerned about the impact of the project on the regional fishing industry. Their opposition to the project was intense and in July 1972 Iwanai was forced to freeze the memorandum it had signed with Hokkaido Electric. The power company, at this time, was confronted by an expected electricity shortage and was forced to postpone the nuclear plant in favour of the Date oil-fired plant in order to balance the electricity market in Hokkaido.

Economic resistance

The first signs of resistance to the Kyowa-Tomari plant emerged on 28 March 1970 when fishermen from Iwanai established the **Genpatsu setchi hantai taisaku iinkai** [Policy Committee for Opposing the Construction of a Nuclear Power Plant; hereafter referred to as the Policy Committee].

This Policy Committee was to form the basis of resistance to the nuclear project.[11]

The Iwanai Fishing Co-operative, located to the south of Kyowa town and Tomari village, had fishing rights in Iwanai port and those rights stretched to the border of Kyowa town. The power company needed to acquire a section of their property rights in order to use the Iwanai port for transporting construction components and nuclear fuels. In Iwanai town, there were prospects for a continued expansion of the fishing industry. Between 1965 and 1971, the value of fishing had increased from 160 million yen to 300 million yen and the co-operative projected that this value would increase to 600 million yen in the coming five year period. The most important types of fish to the co-operative were walleye pollack caught near the coast and salmon trout caught by deep-sea fishermen in Soviet territorial waters. The co-operative regarded prospects in coastal fishing as relatively more important than those in deep-sea fishing. The Soviet Union, in the context of establishing a 200 mile

----

11. See Tanaka K., 'Genpatsu richi to chiiki shakai - hokkaido: iwanai' [Nuclear Siting and Regional Society: Hokkaido] in Inuta T. and Nagatani K., eds., **Chiiki funsō no kenkyū: jichi tai no yakuwari to gōi keisei no jōken** [Research on Regional Conflict: The Role of Local Administration and Conditions for Public Acceptance], Gakuyō shōbō, Tokyo, 1981 for an analysis of the dispute over the siting of the Kyowa-Tomari nuclear project. Tanaka's analysis focusses on the ability of Iwanai town to manage resistance to the project by the Iwanai fishing co-operative. His interpretation, therefore, stresses the importance of interest group resistance in delaying the settlement over the project. Tanaka does not consider Hokkaido Electric's response to the development of the project.

economic zone, had begun to limit trout fishing in its waters. The co-operative, expecting further restrictions and a subsequent decline in trout fishing, was investing in the development of coastal fishing.[12]

In addition, the Iwanai Fishing Co-operative was also involved heavily in the processing of fish. In 1971, the value of fish processing was 400 million yen. The Iwanai co-operative was the major marketing centre for the fishing industry in the Ganu region and processed and distributed all the fish going to other areas in Japan as well as all the fish coming into the Ganu region from other areas. The Iwanai Fishing Co-operative processed fish from the other three fishing co-operatives in the Ganu region which included Tomari and Sakazuki Fishing Co-operatives in Tomari village and the large Kamoenai Fishing Co-operative in Kamoenai village.[13]

The prospects for the fishing industry, in terms of the increasing importance of coastal fishing and the role of Iwanai as a distribution centre for the region, heightened the concern about the potential impact of waste water on the fishing industry. This concern was exacerbated as the Iwanai co-operative argued that the power company was attempting to develop the project in a nearby area without taking into account their interests. The development of the project was seen as providing benefits to Kyowa and Tomari villages at the expense of the Iwanai Fishing Co-operative.

----

12. Information obtained from Hokkaido Electric, 1983.

13. Data received from Hokkaido Electric, 1983.

Hokkaido Electric did not anticipate the emergence of opposition by the Iwanai Fishing Co-operative. The selection of the Kyowa-Tomari site did not take into account the differing impact of the project between Iwanai, on the one hand, and Kyowa and Tomari, on the other. The power company failed to realise that the use of the Iwanai port required the transfer of a section of the Iwanai co-operative's fishing rights. Furthermore, Hokkaido Electric did not assess accurately the structure of the fishing indusry in Ganu and the important role that the Iwanai Fishing Co-operative played in that industry.[14] As noted in earlier chapters, the failure to assess the uneven impact of projects across different administrative units and interest groups is a major reason for delay in the implementation of energy projects in Japan.

The Policy Committee attempted to form an economic alliance with other co-operatives in the Ganu region to improve its bargaining position with the power company. On 25 June 1970, it established the **Genpatsu setchi hantai gyōkō rengō iinkai** [Fishing Co-operative Alliance for Opposing the Construction of the Nuclear Plant; hereafter referred to as the Fishing Alliance]. In November, the Fishing Alliance sponsored a series of lectures on nuclear safety and ocean pollution in Iwanai. These lectures aimed at creating more local public awareness of the risks of nuclear energy.

Other co-operatives from the Ganu region entered into the alliance to improve their bargaining positions with the

----

14. Interviews with personnel from Hokkaido Electric, 1983.

power company over property right transfer and compensation arrangements. The Fishing Alliance, however, was only shortlived. The impact of the project differed for the four fishing co-operatives in the region. The Kamoenai co-operative did not have property rights in the area where waste water would be discharged into the ocean. Furthermore, it was located ten to fifteen kilometres from the proposed waste water pipes and would not be affected by waste water. The relatively small Sakazuki and Tomari Fishing Co-operatives, while having some interest in coastal fishing, were developing offshore fishing which would not be affected adversely by waste water. The Sakazuki Co-operative promoted the project. The major part of the co-operative's catch was derived from off-shore fishing. The Tomari co-operative decided to undertake an investigation on the impact of waste water as a higher proportion of their catch originated from coastal fishing.[15]

The ability of the Fishing Alliance in Ganu to oppose the project was relatively weaker than the ability of the Nanto Fishing Co-operatives to delay the Ashihama project. The size of the industry in Ganu was relatively small. The adverse effects of the Ashihama project were evenly distributed amongst the fishing co-operatives in Nanto. It will be recalled from Chapter Five that the pearl industry required specialisation in the production process and that it was perceived that the entire industry would be

----

15. Information obtained in an interview with officials from the Tomari Fishing Co-operative, 1983.

jeopardised if the Kowaura co-operative were adversely affected by the Ashihama project. In contrast, the effects of the project did not fall flatly across the four co-operatives in Ganu. For example, the Sakazuki Fishing Co-operative promoted the project because they weighed highly the benefits of receiving compensation and, given the importance of off-shore fishing, did not concern themselves with the impact of waste water on coastal fishing.

Ideological Resistance

There also emerged a leftist party based movement which opposed the Kyowa-Tomari plant. This movement called itself the **Gōsha Kyōtō** [Five Member Struggle Committee] and consisted mainly of the Japan Socialist Party (JSP) and its affiliates based outside the Ganu region. The movement was very concerned about the risks of the nuclear project.[16] In Japan, a considerable degree of opposition to environmental pollution had emerged in the late 1960's and early 1970's. The Kyowa-Tomari nuclear plant was not immune from this increased concern about the quality of the environment. Leftist elements were particularly worried about the failure of an Emergency Core Cooling System (ECCS) experiment in the United States and the Tsuruga nuclear accident. The promoters of nuclear energy had been stressing the safety of nuclear technology and both of these

----

16. See **Hokkaido shinbun** [Hokkaido Newspaper], 14 March 1971 and **Hokkaido taimuzu** [Hokkaido Times], 14 March 1971.

accidents led to considerable distrust in the nuclear administration in Japan in the early 1970s.[17]

The movement had another interest in opposing nuclear energy. Hokkaido, alongside Kyushu, is the major coal producing area of Japan. The Hokkaido Socialist Party, in conformance with the JSP's national policy, promoted the utilisation of domestic coal in Hokkaido. The production of steaming coal in Hokkaido had, however, declined from 15 million tonnes in 1965 to 10 million tonnes in 1971 and there was concern that coal production would decline even further in the coming years.[18] The development of the nuclear plant appeared to represent a move away from coal utilisation in Hokkaido. There was therefore considerable resistance within the JSP to any further reduction in the use of coal as this was likely to reduce employment opportunities in the region substantially.[19]

The leftist movement attempted to sensitise the local community to the risk involved in the development of nuclear power. From early 1971, the Struggle Committee sponsored a series of meetings in Iwanai town, and sent petitions to the power company, the prefectural assembly and the four towns and villages in the Ganu region. The anti-nuclear movement

----

17. See Lesbirel S.H., **Factors Influencing Long Term Uranium Demand in Japan with Special Reference to Nuclear Siting**, unpublished Honours Thesis, Griffith University, Brisbane, 1980, especially Chapter 4.

18. See Hokkaido shōkō kankyō bu, **Hokkaido enerugii gaiyō** [Energy in Hokkaido], Hokkaido shōkō kankyō bu, 1983, pp.161-162.

19. Information received from an official of the Hokkaido government and a party member of the JSP, 1983.

sought to persuade the community that the risks of nuclear power should be given more attention in deciding whether to accept the project or not. This approach, together with opposition by the Iwanai Fishing Co-operative, had a considerable amount of success in sensitising the public to the risks of nuclear power.

The leftist movement also sought to create political support in Kyowa town and Tomari village, but did not have measurable success. These areas were predominantly rural and were dominated by conservative governments. The local governments, as well as their publics, supported the development of the project for regional development purposes. Hence, there was no economic, political or ideological foundation on which to stimulate community resistance in those areas. As in the siting of the Hamaoka project, the leftist anti-nuclear movement had considerable difficulty in mobilising the community to oppose the project.

At the prefectural level, the movement was successful in appealing to the Liberal Democratic Party (LDP) to delay the project. The LDP, like the JSP, had a policy of protecting the domestic coal industry and the party leadership was worried that strong support for the project might create conflict within the LDP. With the JSP's strength in the Hokkaido assembly having increased to a little less than half of the assembly seats[20] there was a risk that the JSP

----

20. See Asahi shinbun sha, **Asahi nenkan** [Asahi Yearbook], Asahi shinbun sha, Tokyo various issues, 1965-1972.

would be able to capitalise on such conflict in the coming election.[21]

The prefectural government was, therefore, not willing to play a major role in facilitating the settlement process and Hokkaido Electric was faced with a lack of enthusiasm on the part of the prefecture to support the project openly and to perform a mediatory role between Hokkaido Electric and the Iwanai Fishing Co-operative. This situation contrasts with that of the siting of the Matsushima coal-fired project in Kyushu, another coal producing area. In that settlement, which was analysed in Chapter 7, there was bipartisan support for the project by the LDP and the JSP. Both political parties felt that the project would facilitate the recovery of the ailing coal industry. It would appear that prefectural governments in coal producing areas, are generally likely to support the development of coal-fired plants over nuclear projects.

Impact on town politics

The Iwanai town leadership did not expect the emergence of such intense opposition to the nuclear project. Mayor Nagahama saw the project as a means of assisting economic development in the town. Although Iwanai was the biggest town in the Ganu region, its economywas facing several problems. The town's Financial Index had declined from 0.35

----

21. Information received from an official of the Hokkaido branch of the LDP, 1983.

in 1968 to 0.26 in 1972[22] and Nagahama was worried about the town's ability to supply necessary public goods, such as hospitals, in order to facilitate social development. He felt that the development of the nuclear project, while benefiting Kyowa and Tomari, would also stimulate growth in the regional economy and that Iwanai would also share in the benefits of that growth. In particular, Nagahama argued that the town's construction and service industries would greatly benefit from the project.[23]

Nagahama set out to foster business support for the project. The Iwanai Town Chamber of Commerce and Industry and the **Iwanai genpatsu sokushin kyō** [Group for the Promotion of Nuclear Power], consisting of local conservative politicians, played an important role in creating the necessary support for the project by sponsoring lecture series on the safety of nuclear power and had been taking community groups to visit areas in Honshu where nuclear plants were being developed or were in operation. These two groups mobilised commercial and political support for the project and appealed to the Iwanai assembly to accept the project.[24]

The views of both opponents and supporters of the projects were registered with the **Iwanai chō gikai sangyō jonin iinkai** [Standing Committee for Iwanai Town Industry;

----

22. See Jichi shō zaisei kyoku shidō ka, **Shichōson betsu kessan jōkyō shirabe** [An Examination of Local Accounts], Jichi shō zaisei kyoku shidō ka, various issues, 1968-1973.

23. Interview with official from Iwanai town, 1983.

24. Information obtained from Hokkaido Electric, 1983.

hereafter referred to as the Standing Committee]. This committee consisted of local politicians and had substantial political clout in the town. In 1969, it had been designated by the assembly to consider development strategies for the town. By early 1972, it was clear to the Committee that the town was split over the nuclear issue and that the opposition forces were gaining considerable strength. On 24 June, the Standing Committee decided to adopt a policy of opposing the Kyowa-Tomari nuclear plant.[25]

Nagahama was worried about the Standing Committee decision and on 20 February 1973 froze the memorandum which the town had signed with Hokkaido Electric in 1969. Nagahama was an independent candidate and had won the election in 1969, uncontested, with the backing of the Regional Council of Trade Unions and the Iwanai Fishing Co-operative. Their backing was critical to his position as Mayor of Iwanai. Nagahama was concerned that continued promotion of the project, while being in the interests of the commercial sector, would make it difficult for him to obtain the support of fishermen and trade unions in the coming 1973 elections.[26]

Nagahama's declaration contained three major points. The first was that the town would oppose the Kyowa-Tomari

----

25. See **Asahi shinbun: Hokkaido ban** [Asahi Newspaper: Hokkaido Edition], **Mainichi shinbun: Hokkaido ban** [Mainichi Newspaper: Hokkaido Edition], **Hokkaido taimuzu** [Hokkaido Times] and **Hokkaido shinbun** [Hokkaido Newspaper], various issues from 21 February to 9 March 1973.

26. Information received from an official of Iwanai town, 1983.

nuclear plant until there was agreement in the town over nuclear safety. The second was that the town would examine a new memorandum with Hokkaido Electric if the safety of nuclear energy could be guaranteed by the power company. The third was that the town would continue with its five year plan for expanding the Iwanai port, but would not construct facilities for loading materials related to the construction and operation of the nuclear plant as long as there was opposition by fishermen.[27] His position, thus, represented a compromise between the opponents and supporters of the project in order to maintain his electoral backing. He needed to be seen to be delaying the project but also wanted to leave open the option of project development in the future.

Promoter response

The freezing of the memorandum by Nagahama surprised the Hokkaido Electric Power Company. It put the company in a difficult position with respect to electricity supply and demand. By 1973, Hokkaido Electric was expecting a shortfall on five year forecast demand. Between 1970 and 1973 forecast electricity demand had increased by 8.0 per cent per annum from 2240 MW to 2820 MW. Actual supply in 1973 was 1993 MW. The Tokoma-Atsuma fossil-fuelled plant, which was in the licensing stage, was expected to add 350 MW of capacity to the existing grid. The company, therefore, expected a shortfall of 474 MW on five year forecast

----

27. See **Hokkaido shinbun** [Hokkaido Newspaper], 16 July 1973.

demand.[28] The only two large scale plants which could be expected to fill this expected supply/demand gap were the Kyowa-Tomari nuclear plant and the Date oil-fired plant. The power company was put in a position of choosing between these two plants in order to meet expected increases in electricity demand.[29]

Hokkaido Electric had been negotiating with Date city over the development of the oil-fired plant. Fishing co-operatives in Date city strongly opposed the siting of the fossil-fuelled plant. The major problem surrounding the negotiations was racial conflict between the Date Fishing Co-operative, consisting of Japanese, and the Usu Fishing Co-operative, consisting of Ainu, over the transfer of property rights. The construction of the project only required the relinquishment of the Date Fishing Co-operative's fishing rights. Hokkaido Electric was, therefore, not prepared to pay compensation to the neighbouring Usu Fishing Co-operative. The Ainu felt that Hokkaido Electric and the Date city administration were not taking their interests into account in the development of the project. The JSP was supporting the Ainu in their claims for compensation and the issue became a prefectural political issue in the early 1970s.

----

28. Information received from, Tokyo Electric Power Company, 1984 and Shigen enerugii chō kōeki jigyō bu, **op.cit.**, various issues, 1970-1974.

29. This section on the choice between the development of the Kyowa-Tomari nuclear project and the Date oil-fired plant is based on extensive interviews with personnel from Hokkaido Electric, 1983.

The power company, faced with substantial resistance at both sites, decided to give priority to the Date plant. This scheduling strategy was a reflection of the increased economic and political costs of developing the Kyowa-Tomari nuclear plant. The power company decided to postpone the development of the nuclear plant by two years. Hokkaido Electric now planned to start construction of the nuclear plant in 1976 and commence commercial operations in 1981.

The initial estimate of the construction cost of the 350 MW Kyowa-Tomari plant was approximately 25000 million yen. By early 1973, that cost had increased to 35000 million yen. In contrast, the construction cost of the Date project, which comprised two plants, totalled 39990 million yen in 1973. The major element in the cost escalation of the nuclear plant was the increased size of the plant to 550 MW which meant a longer construction leadtime and, therefore, higher interest rate repayments on borrowed capital. Hokkaido Electric was particularly worried about the potential impact of higher construction costs on already increasing electricity tariffs in Hokkaido.

The higher cost of the nuclear project reduced the compensation pool which Hokkaido Electric could use to reach a settlement with the community in Ganu. The power company's bargaining position, was weaker vis-à-vis the community in Ganu relative to its bargaining position with the community in Date city. Reaching a quick settlement in Date was expected to be less costly than in Kyowa-Tomari. The power company had received information that the Ganu Fishing Co-operatives would demand, cumulatively, 2500 million yen for the transfer of property rights and necessary compensation. This demand was based on a claim being made by the Onagawa Fishing Co-operative over the transfer of property rights in the development of Tohoku Electric's Onagawa nuclear project. Such a payment was expected to increase the cost of the Kyowa-Tomari project by approximately 9 per cent. At the same time, the Date and Usu Fishing Co-operatives were requesting a total of 900 million yen in payment for their acceptance of the project. The power company calculated that this would increase the cost of the oil-fired project by 2.5 per cent. In contrast to the Date project, the amount of compensation necessary to win agreement for the Kyowa-Tomari plant would have substantially reduced the the economic viability of the nuclear plant.

The power company also expected a settlement to take longer in the case of the Kyowa-Tomari nuclear plant. The Iwanai assembly had adopted an anti-nuclear resolution, and it would take some time to shift the assembly position. On the other hand, Hokkaido Electric had already started negotiations with the Date Fishing Co-operatives. Furthermore, Date city was promoting the plant and was acting as a mediator between the power company and the fishing co-operatives in that city. The doors to bargaining were open in Date but not in Iwanai.

Hokkaido Electric chose to develop the less costly project in order to meet expected increases in electricity demand. This strategy of postponement differs noticeably from the approach adopted by Chubu Electric in Mie Prefecture in the

1960s. Chubu Electric, when faced with a similar situation, attempted to use political power to influence opposition by local fishermen in Nanto. This was reflected in Nakasone's visit to the region, and the pressure exerted on the Yoshida faction to allow investigations to commence. The use of power did not succeed and Chubu Electric had ultimately to abandon the project. In contrast, Hokkaido Electric did not use power, but adopted a market strategy of developing an alternative project which was less costly. Hokkaido Electric's management of the dispute allowed the company to meet supply targets and, at the same time, kept open the possibility of developing the Kyowa-Tomari project at a later date.

Plant site modification

Although Hokkaido Electric intentionally postponed the Kyowa-Tomari nuclear power plant, it saw the development of the plant as essential in the longer term. By 1977, both Hokkaido Electric and the Ganu community were more willing to negotiate a settlement. Between 1974 and 1977 the promoters of the project were facing electricity shortages, and placed considerable importance on the project because of security concerns which emerged from the 1973 oil crisis. Important energy policy changes at the national level, such as the establishment of the Three Laws increased the value of the project to the Ganu region. Subsequently, however, the economic and political cost of the project increased substantially because of the establishment of a 200 mile economic zone by the Soviet Union and the possibility of a terrorist attack on the nuclear installation. The company was required to change the site for the reactor to Tomari village, thereby delaying the development of the project even further.

Revised electricity projections and the oil crisis

Although Hokkaido Electric originally planned to postpone development of the nuclear plant at Kyowa-Tomari by only two years, it was not until 1976, four years after the mayor of Iwanai had signed the memorandum between his town and Hokkaido Electric, that the company seriously pushed ahead with the project. This resumption was a product of unforeseen changes in the expected electricity supply and demand situation in Hokkaido. During the period from 1974 to 1977 actual electricity demand in Hokkaido increased by 11.0 per cent per annum compared with an 8.0 per cent increase in the period 1970-1973. This was directly attributable to an upswing in economic activity in Hokkaido and the development of large industries, such as the motor car industry, in southern Hokkaido. Electricity supply by contrast increased at 3.3 per cent annually during 1974-77 and this was a slower rate of growth than in the 1970-73 period when supply increased by 5.5 per cent per annum. The slower growth in supply was caused by a delay in fishing negotiations over the implementation of the Date thermal plant.[30]

----

30. Shigen enerugii chō kōeki jigyō bu, **op.cit.**, various issues, 1974-1978 and information received from Hokkaido Electric and the Hokkaido government, 1983.

The changes led the power company to revise its expectations about electricity supply and demand in Hokkaido. Between 1974 and 1977, five year forecast demand projections increased from 2920 MW in 1979 to 3660 MW in 1982. This represented a 5.8 per cent per annum increase in forecast demand. Capacity supply, however, was only expected to increase at a rate of 4.2 per cent per annum and the power company became concerned that electricity demand would outstrip supply in the mid-1980s.[31] Hokkaido Electric had earlier promoted the project as an experiment in nuclear technology so as to receive subsidies from the national government. The changed electricity supply and demand situation increased the value of the project in terms of equilibrating the electricity market in Hokkaido.

The importance of the Kyowa-Tomari plant also increased because of the heightened concern about oil supply disruptions in the 1973 oil crisis. Up until the early 1970's, Hokkaido's electricity supply capacity consisted mainly of fossil-fuelled plants fueled by domestic coal and hydroelectric power. The Date oil-fired plant was important in Hokkaido Electric's policy of supply diversification away from domestic coal. The 1973 oil crisis caused concern in Hokkaido not only about the price of oil but also the availability of oil supplies. Energy policy in Hokkaido started to reflect this concern and subsequently stressed a

----

31. Shigen enerugii chō kōeki jigyō bu, **op.cit**, various issues, 1974-1978.

more balanced approach to regional energy policy which allowed for diversification into nuclear power.[32]

The power company perceived that the need for a nuclear power plant was greater in Hokkaido because of its greater vulnerability to electricity supply disruptions compared to other parts of Japan, such as Honshu. In Honshu, the electricity grid was interconnected amongst power companies. It was, therefore, possible to purchase electricity from and supply electricity to other power companies in the event of shortages. As noted earlier, Hokkaido was only connected to the mainland by a small transmission line, and the power company could not rely on purchasing or borrowing electricity from other power companies should electricity shortages occur.

The power company, in response to these changed expectations, attempted to speed up the development of the Tokoma-Atsuma coal-fired plant. This gave the power company some breathing space, but it decided that it would have to submit the nuclear proposal for Denchōshin approval by 1977, or at the latest 1978, if it were to avert expected electricity shortages.[33]

External events and community expectations

The Japanese government, in response to the oil crisis, revised national energy policy and gave more emphasis to the

----

32. See Hokkaido shōkō kankyō bu, **op.cit.**, pp.109-123 for a more detailed statement of Hokkaido's energy policy.

33. Information obtained from Hokkaido Electric, 1983.

development of alternative energy projects, such as nuclear, LNG and coal projects. In 1974, it instituted major policy and administrative reforms which were designed to facilitate the development of energy projects at the regional level. The first was the establishment of the Three Laws in 1974. The second was the development of tighter safety measures by restructuring the nuclear administration in the same year. These two policy changes facilitated bargaining between Hokkaido Electric and the Ganu community.

The Three Laws increased the expected benefits of accepting the project. As noted in Chapter 2, they provide large benefits in the form of social overhead capital to localities accepting projects and their surrounding areas. Kyowa town expected to receive approximately 1000 million yen during the construction stage while Iwanai, Tomari and Kamoenai jointly expected to obtain about 2000 million yen.[34] Kyowa town and Tomari and Kamoenai villages were promoting the project for regional development purposes. They felt that continued opposition by Iwanai town would delay the delivery of project benefits and impede regional economic development. The local governments in Kyowa, Tomari and Kamoenai had been creating expectations among their respective communities that promotion of the project would bring social and economic benefits quickly. The establishment of the Three Laws further intensified the community desire for a quick settlement over the construction of the project. The leadership was, concerned

----

34. Information received from MITI, 1983.

that resistance might emerge if community expectations were not fulfilled.[35]

Changes in the nuclear administration reduced the perceived risk of nuclear power to the regional community. The Science and Technology Agency (STA) established the **Genshiryoku anzen iinkai** [Nuclear Energy Safety Committee] within the **Genshiryoku iinkai** [Nuclear Energy Committee]. The former was concerned with nuclear safety, while the latter was to continue promoting nuclear energy. The government was able to reduce the expected risks of nuclear power by instituting a system of measures designed to double check the safety of nuclear plants. The national government was able to persuade the Ganu community that it could guarantee the safety of nuclear power and this reduced the concern in the community about the risks of the project.

The renewed and stronger regional interest in the project put pressure on Iwanai town and the Iwanai Fishing Co-operative to accept the nuclear power plant. Other areas to the north of Iwanai argued that the benefits of the project had increased while the risks had been reduced. Furthermore, they argued that continued opposition in Iwanai would be at the expense of attaining important regional social and economic policy objectives. The broader regional interest in the project was a major element in weakening the opposition to the project in Iwanai.

----

35. Interviews with Mayor of Tomari town, 1983.

Power company bargaining strategies

The establishment of the Three Laws and the strengthening of the nuclear administration also expanded the power company's compensation pool which could be used in negotiating a settlement with the community. The Three Laws reduced the power company's need to provide regional development compensation. The ability of the national government to guarantee nuclear safety reduced the amount of compensation necessary to justify the risks of the project. Hokkaido Electric was, therefore, more willing to enter negotiations with the community over a settlement.

The power company perceived that the major restraint to the development of the project was opposition in Iwanai town and in particular, resistance by the Iwanai Fishing Co-operative. The Iwanai Fishing Co-operative's bargaining position was strong. It had property rights which had to be relinquished for the use of the port in Iwanai town. Its position was enhanced because the town assembly had frozen the memorandum with Hokkaido Electric. The company attempted to isolate the resistance by the co-operative by commencing negotiations with areas to the north of Iwanai town. The key element in Hokkaido Electric's strategy was to commence negotiations with the Tomari Fishing Co-operative and then attempt to sign a new memorandum with Iwanai town. It was felt that success in these two strategies would improve the power company's bargaining position with the Iwanai Fishing Co-operative.[36]

----

36. This section on Hokkaido Electric's strategies for isolating the Iwanai Fishing Co-operative is based on interviews with personnel from the power company, 1983.

In 1974, the power company commenced negotiations with the Tomari Fishing Co-operative. At the start of the negotiations, there was a substantial gap between what the power company was prepared to pay and what the fishing co-operative was prepared to accept in return for the transfer of fishing rights. The power company based its offer price on the Compensation Standards. The Tomari Fishing Co-operative based its demand price on the amount being demanded by the Onagawa Fishing Co-operative in Miyagi Prefecture. The power company perceived that its bargaining position was relatively weak vis-à-vis the Tomari co-operative. Hokkaido Electric, unlike other power companies in Japan, could locate plants in only one prefecture, namely Hokkaido. Hokkaido is under the one administration and, therefore, the company could not induce competition among different prefectural governments to provide an alternative site for the nuclear power plant. The company considered alternative locations but assessed that it would be more costly to change the location from the Ganu region. Cooling water was not available all year round in the northern part of Hokkaido as the oceans freeze during winter months. The high cost of transmission lines to the southern part of Hokkaido prevented the development of a nuclear project in eastern Hokkaido.

The bargaining position of the Tomari co-operative was strong because of the strong opposition by the Iwanai Fishing Co-operative. The leadership perceived that its position on the project was the key to Hokkaido Electric's strategy to winning agreement over the implementation of the project. It knew that the power company would have to negotiate with the Tomari co-operative in order to improve its bargaining position with the the Iwanai Fishing Co-operative. The leadership judged that the bargaining position of the Iwanai co-operative would be greatly enhanced if the Tomari Fishing Co-operative undertook a policy of opposing the project.[37]

Hokkaido Electric, in negotiating with the Tomari and Iwanai co-operatives, also had to consider ongoing negotiations between other power companies and fishing co-operatives. The power industry in Japan was exerting considerable pressure on Tohoku Electric not to pay large sums of compensation to the Onagawa Fishing Co-operative, as this would increase the demands by all fishing co-operatives in Japan. Hokkaido Electric had also been criticised by other power companies in its negotiations with the fishing co-operatives in Date. It wished to avoid affecting adversely other power companies by paying high amounts of compensation to both the Tomari and Iwanai Fishing Co-operatives.

A major concern of the power industry in Japan in the 1970's was the increase in compensation claims consequent upon the development of nuclear power plants. The industry thought that the role of the Compensation Standards in facilitating energy project developments would be reduced if fishing co-operatives relied on the 'similar situation formula' instead of the formula based on the value of the property right in negotiations over project development. As

----

37. Information received from personnel of the Tomari Fishing Co-operative, 1983.

noted in Table 2.2, the similar situation formulae contained in the compensation standards allows property right transfer payments to be based on previous settlements. The power industry perceived that compensation claims would increase as each fishing co-operative would base its demands on the highest claim that was previously made. There was concern that the demands made by the Onagawa co-operative would reduce the economic viability of nuclear power in Japan.[38]

In this way, Hokkaido Electric faced a dilemma in negotiating a settlement with the Tomari Fishing Co-operative. The company responded by negotiating first on fishing development compensation and leaving property right transfer arrangements for a later date. On 9 October 1976, Hokkaido Electric signed an agreement with the Tomari Fishing Co-operative to pay 90 million yen compensation for fishing development. The agreement stated that payment would be made after the conclusion of property right transfer arrangements with the co-operative.[39] The power company thus was able to attain three objectives simultaneously. The first was keeping the Tomari co-operative at the negotiating table over the transfer of property rights. The second was to improve its position vis-à-vis the Iwanai Fishing Co-operative. The third was

----

38. See an interesting supplement in **Nihon keizai shinbun** [Japan Economic Newspaper], 4 December 1978 for details of a number of negotiations over the transfer of fishing rights in the context of siting energy power plants in Japan.

39. See **Hokkaido shinbun** [Hokkaido Newspaper], 9 October 1976.

not to affect property right transfer negotiations at other sites in Japan.

The power company had earlier persuaded the prefecture as well as the Tomari Fishing Co-operative to undertake investigations on the impact of waste water on the marine environment. The major conclusion of those investigations, which were published in 1972, was that the impact of the project on the Iwanai fishing industry would be substantially greater than that of the effect on other fishing co-operatives in the region. The impact on the Iwanai Fishing Co-operative stemmed from waste water increasing the temperature of the ocean in an area used by walleye pollock as a breeding ground. Fishermen were concerned that the temperature increases would reduce the reproductive capacity of the pollock.[40]

In response, the power company decided to change the location of the waste water pipes so as to reduce the impact on the Iwanai Fishing Co-operative. This strategy involved a technical fix to a political and economic bargaining problem. The proposed location of the pipes was shifted two kilometers to the north, and the mouth of the pipes were extended approximately 800 meters out to sea. These changes

----

40. See **Nihon keizai shinbun: Hokkaido ban** [Japan Economic Newspaper: Hokkaido Edition], **Hokkaido taimuzu** [Hokkaido Times], and **Asahi shinbun: Hokkaido ban** [Asahi Newspaper: Hokkaido Edition], various issues, 20-21 April 1972 and **Asahi shinbun** [Asahi Newspaper], **Hokkaido taimuzu** [Hokkaido Times], **Mainichi shinbun: Hokkaido ban** [Mainichi Newspaper: Hokkaido Edition], **Yomiuri shinbun: Hokkaido ban** [Yomiuri Newspaper: Hokkaido Edition], and **Hokkaido shinbun: Shiribeshi ban** [Hokkaido Newspaper: Shiribeshi edition], various issues, 19-21 August 1972.

were designed to minimise the impact of waste water on the pollock's breeding ground which was located in shallow water close to the coastline.[41]

The power company's position was also enhanced by the increase in oil prices after the 1973 oil crisis. The deep-sea fishermen in the Iwanai co-operative used 'A' grade oil and the price of this oil increased markedly after 1973. As noted earlier, the majority of Iwanai fishermen were involved in deep-sea fishing. The higher operating costs caused financial problems for the co-operative and it had developed a large debt.[42] Hence, the benefits of the nuclear project to the co-operative in terms of fishing development compensation and other compensation for the use of port facilities increased.

The increased cost of deep-sea fishing and the perceived decline in the risk of accepting the project led in 1976 to the emergence of the **Genpatsu to gyōgyō o kangaeru kai** [Committee for Considering Nuclear Energy and the Fishing Industry; hereafter referred to as the Fishing Industry Committee]. The Fishing Industry Committee consisted mainly of deep-sea fishermen and emerged as a force within the Iwanai Fishing Co-operative. The Committee commenced preliminary negotiations with Hokkaido Electric over the transfer of property rights for the use of the Iwanai port

----

41. Information received from Hokkaido Electric, 1983.

42. Information obtained in interviews with personnel from the Tomari Fishing Co-operative, 1983.

and compensation for fishing development.[43] The emergence of the Fishing Industry Commitee was similar to the emergence of the Director's Committee in the siting of the Hamaoka nuclear power plant. In both disputes the effects of the power plant on deep-sea fishermen differed from the effects on coastal fishermen. Deep-sea fishermen saw compensation as a means of reducing large debts which their co-operatives had incurred. This incentive was a major factor facilitating the negotiating process.

Hokkaido Electric also initiated measures to increase the benefits of the project to Iwanai town over and above those expected to accrue from funds provided for by the provision of public goods by the Three Laws. In 1977, the power company bought land, owned by the town, at a cost of 4000 million yen. This was to assist the town in overcoming financial difficulties. This land was bought for the purpose of building apartments in which to house construction workers. The influx of skilled workers, particularly during the construction process, was expected to increase the demand for goods and services within Iwanai town. Furthermore, the company promised to give priority to purchasing goods and employing unskilled labour from the town.[44]

The weakening of the opposition by the Iwanai Fishing Co-operative and the community in Iwanai town was a critical

----

43. See **Hokkaido taimuzu** [Hokkaido Times] and **Hokkaido shinbun** [Hokkaido Newspaper], various issues, 9 February to 13 February 1976.

44. Information received from Hokkaido Electric, 1983.

factor in the re-election of Nagahama in July 1977. The JSP opposed the nuclear plant and saw the election as a means of winning power in the local assembly. The election was fought between Nagahama and a JSP party candidate over the issue of whether or not the nuclear project should be developed. Nagahama won the election overwhelmingly. Nagahama's victory reflected this changed attitude in Iwanai and allowed him to recommence promoting the project.

After the election, Nagahama set out to create a consensus, so that the assembly could be persuaded to accept the project. He sent a questionnaire to Hokkaido Electric which consisted of questions about nuclear safety, radiation monitoring and co-operation money for the development of industry in Iwanai town. Nagahama used the power company's willingness to compensate the community to create support for the project. On 12 March 1977, he declared his intention to sign a new memorandum with power company to allow the construction of the plant.[45]

Increasing plant cost

Although the Fishing Industry Committee had started negotiations with Hokkaido Electric, there was still considerable resistance to the project by coastal fishermen. The conflict between deep-sea and coastal fishermen was over

----

45. For details, see **Hokkaido taimuzu** [Hokkaido Times], **Asahi shinbun: Hokkaido ban** [Asahi Newspaper: Hokkaido Edition], **Mainichi shinbun: Hokkaido ban** [Mainichi Newspaper: Hokkaido Edition], **Yomiuri shinbun: Hokkaido ban** [Yomiuri Newspaper: Hokkaido Edition], and **Hokkaido shinbun** [Hokkaido Newspaper], various issues, 12 March to 17 March 1977.

the distribution and use of compensation received from the power company. Coastal fishermen argued that the waste water would directly affect the walleye pollock breeding ground despite the change in the location of the waste water pipes. The coastal fisherman felt that the deep-sea fishermen would receive a larger share of compensation despite the fact that they were incurring no costs from the project. They argued that the compensation would be used to alleviate the financial burden of deep-sea fishermen and that coastal fishermen would receive no direct benefits for approving the project.[46]

In April 1977, the Soviet Union established a 200 mile economic zone. This had a major impact on the Iwanai Fishing Co-operative's attitude toward the Kyowa-Tomari nuclear plant. The forty per cent of the co-operative's catch which had been caught in Soviet waters was now in jeopardy. The importance of coastal fishing to the co-operative increased markedly. Many deep-sea fishermen became worried about future prospects for the fishing in Soviet waters, and felt that they would have to embark on the development of coastal or offshore fishing. This concern led to the defeat of a motion put forward from the Fishing Industry Committee in March 1978 to change the co-operative's policy to one of negotiating with the power company. The co-operative was faced by an increasing

----

46. See **Mainichi shinbun: hokkaido ban** [Mainichi Newspaper: Hokkaido Edition], **Yomiuri shinbun: hokkaido ban** [Yomiuri Newspaper: Hokkaido Edition], and **Hokkaido taimuzu** [Hokkaido Times], various issues, 4 March to 6 March 1978.

financial debt and the possibility of a reduced catch. The defeat of the motion was a tactic to improve its bargaining position with the power company so as to increase the property right transfer price and fishing development compensation.

In early 1978, the power company was also confronted by the risk of a future terrorist assault on the plant. Leftist radicals, who attacked and bombed the control tower at the Narita International Airport, stated that the Kyowa-Tomari nuclear plant would be next on their agenda. The statement caused immediate concern not only to the power company, but also to the Hokkaido government and MITI. The power company was concerned that any attack on the plant would be costly in terms of the operation and management of the plant. The prefectural government and MITI were anxious about not being able to guarantee the safety of the nuclear plant. MITI was also concerned that the terrorist issue would become a central element in the safety dispute and would significantly impede the development of nuclear power in Japan.

The promoters of the plant perceived that the Kyowa-Tomari project was extremely vulnerable to a terrorist attack and took seriously the threat of the attack on the nuclear plant. Geographically, the power plant was spread over a wide area and would require extensive and costly surveillance. As illustrated in Map 8.1, there were three features of the design of the plant which were vulnerable to a terrorist attack. The first was in loading materials and components at Iwanai port. The second was in transporting those materials and components to and from the plant. The third, and perhaps most important, was in the extreme vulnerability of the waste water pipes which stretched approximately 6000 metres from the containment vessel to the ocean.[47]

The continued opposition by the Iwanai Fishing Co-operative and the possibility of a terrorist attack increased the expected compensation and management cost of developing the project at Kyowa-Tomari. The power company decided to change the location of the reactor to Tomari village.[48] Such a major design change had never before been contemplated in Japan, but the power company calculated that the benefits of such a change outweighed the costs. The cost included further delay of the project, the development of port facilities at Tomari village and the acquisition of land in Tomari. The benefits comprised a reduction in the risk of a terrorist assault on the plant alongside a weakening of the bargaining position of the Iwanai Fishing Co-operative.

By 1978, electricity demand had increased to 2505 MW and this represented a 7.5 per cent per annum increase from 1974. Hokkaido Electric had Date Number One and Two plants ready to commence operation. The Tokoma-Atsuma coal-fired

----

47. Interviews with personnel from Hokkaido Electric and officials from Hokkaido government and MITI, 1983.

48. See **Hokkaido shinbun** [Hokkaido Newspaper] and **Hokkaido taimuzu** [Hokkaido Times], various issues, 30 September to 1 October 1978.

plant and Shiriuchi oil-fired plants received Denchōshin approval in 1977 and 1978 respectively and were expected to start supplying power within three years. Although demand was expected to increase to 3660 MW in the coming five years, the power company had sufficient capacity in the pipeline to equilibrate electricity markets in the future.[49] In 1978, Hokkaido Electric decided to delay further the project and stated that it would postpone the commencement of construction to 1983.[50]

Changing the location of the reactor would require developing a port and buying land at Tomari. The cost of port construction, which included substantial reclamation and the acquisition of land, was perceived to be less than accepting a higher risk of a terrorist assault on the plant. At the Tomari location the power company assessed that it could concentrate the reactor and waste water pipes in the same location and, therefore, minimise the risk of a terrorist attack on the plant. The geographical concentration of the project was critical to the effective operation and management of the plant.

The development of a nuclear plant at Tomari would also expected to reduce the bargaining power of the Iwanai Fishing Co-operative. The development of a port in Tomari would nullify the need to purchase property rights for the use of the port in Iwanai and the power company would only

----

49. Shigen enerugii chō kōeki jigyō bu, **op.cit.**, various issues, 1974-1979.

50. **Hokkaido taimuzu** [Hokkaido Times], 12 October 1978.

be required to pay regional development compensation. This was regarded as an important benefit given the uncertainty involved in attempting to negotiate a settlement with the Iwanai Fishing Co-operative.

The power company made calculations of the costs and benefits of the design change which included the expansion of the project to two plants. These calculations suggested that the site change would save the power company approximately 4100 million yen. The major part of this saving, which totalled 3500 million yen, stemmed from economies of scale derived from the construction of two projects. A saving of 700 million yen in compensation was expected because the power company would not have to negotiate with the Iwanai Fishing Co-operative over the transfer of property rights. The site change also meant that Hokkaido Electric would not have to construct a special road for transporting large construction components and nuclear fuels. This was estimated to save the power company approximately 50 million yen. On the other hand, the construction of a plant and the acquisition of land in Tomari was expected to add 150 million yen to the cost of the project. The net benefits of the site change were even greater than this monetary value if account is taken of the reduced risk of a terrorist attack on the project and the relative cost of other projects capable of meeting expected electricity demand increases.[51]

----

51. Information received from Hokkaido Electric, 1983.

Community negotiations

While the site change weakened the bargaining position of the Iwanai fishing Co-operative, it did not greatly enhance the negotiating position of Tomari village. Tomari village was already, particularly eager to accept the project expecting to obtain relatively large benefits from the project development. These included more fixed asset taxes and a larger share of the funds provided for by the Three Laws. The power company's position was relatively strong vis-à-vis Tomari village as it was not in a position of having to develop the project quickly to meet expected increases in electricity demand. Between 1978 and 1980, electricity demand increases tapered off as a result of higher energy prices in Hokkaido arising from the second oil shock. Expected increases in five year forecast demand declined from 3870 MW (for 1984) in 1979 to 3720 MW (for 1986) in 1981.[52]

Hokkaido Electric wished to commence negotiations with the Tomari Fishing Co-operative while its bargaining position was relatively strong and did so in June 1981. While negotiations were proceeding, the Three Mile Island nuclear accident occurred in the United States in 1979. The accident caused some concern about the safety of nuclear energy on the regional level. Negotiations at the Tomari site were halted for approximately nine months while MITI considered the possibility of such an accident in Japan.

----

52. See Shigen enerugii chō kōeki jigyō bu, **op.cit.**, various issues, 1978-1980.

The community in Tomari, however, was eager to accept the project and the accident only delayed the negotiating process temporarily.[53]

Despite the willingness of Tomari to accept the project, there emerged resistance to the site change in Kyowa town. The community in that town had high expectations about the benefits accruing from the construction of the power plant. The site change meant that their share of benefits from fixed asset taxes and the Three Laws would be reduced substantially. Residents commenced a recall movement to oust the local mayor. Hokkaido Electric was concerned that a new mayor might oppose the project and delay the negotiating process. The power company responded by offering to pay 200 million yen to compensate the town for the loss of benefits expected from the site change.[54]

In June 1981, Hokkaido Electric commenced negotiations with the Tomari Fishing Co-operative. The choice of Tomari reflected the company's negotiating strategy which was two-fold. The first related to the ordering of negotiations between fishing co-operatives in Ganu and the second related to the structure of compensation payment. In order to construct the plant, the power company was legally required to acquire the property rights only from the Tomari Fishing

----

53. Information received from Hokkaido Electric, 1983.

54. See **Hokkaido shinbun** [Hokkaido Newspaper] 2, December 1978 and **Mainichi shinbun: hokkaido ban** [Mainichi Newspaper: Hokkaido Edition], 1 February 1979.

Co-operative. The power company decided accordingly to negotiate initially with the Tomari co-operative. This was a continuation of the company's earlier strategy of isolating potential resistance and was designed to improve the company's position vis-à-vis the other Ganu fishing co-operatives with which it would negotiate over compensation for fishing development.[55]

The ordering of negotiations with the other three co-operatives was Sakazuki, Kamoenai, then, Iwanai. The Sakazuki co-operative was located in Tomari village and, therefore, could be persuaded to agree to the project along the same lines as the Tomari co-operative. Although the Kamoenai Fishing Co-operative was larger than the two co-operatives in Tomari village, the prefecture had decided to provide a subsidy for fishing development. The power company, therefore, was able to maintain roughly the same levels of development compensation to all three co-operatives. Hokkaido Electric assessed that the completion of negotiations with these three co-operatives could be used to exert considerable pressure on the Iwanai Fishing Co-operative to accept the project.

The negotiations with the Tomari Co-operative took place between 10 and 18 June 1981. They centred on the relative share of payment for fishing rights and fishing development compensation. The power company offered 180 million yen which comprised of 90 million yen for property rights and 90

----

55. Information obtained in interviews with personnel from Hokkaido Electric 1983.

million yen for fishing development. The co-operative, basing its demands on Onagawa situation, demanded between 600 and 700 million yen. The power company subsequently offered 220 million yen, thereby, increasing the amount for property rights by 30 million yen. The co-operative, in response, demanded 500 million yen. On 18 June, the prefectural government intervened and an agreement was reached for 300 million yen, comprising of 200 million yen for property rights and 100 million yen for fishing development. The power company was able to keep the amount for fishing development at 100 million yen by paying more for the relinquishment of the fishing rights.[56]

This provided the company with a good position to enter negotiations with the other three co-operatives over fishing development compensation. On 26 June 1981, Hokkaido Electric reached an agreement with the Sakazuki co-operative for 78 million yen.[57] Subsequently, on 1 March 1982 the company reached a compromise with the Kamoenai co-operative for 68 million yen.[58] The power company did not compensate

----

56. For a discussion of the events leading up to the negotiations and the actual negotiations, see **Hokkaido shinbun** [Hokkaido Newspaper], **Hokkaido taimuz** [Hokkaido Times], **Yomiuri shinbun: hokkaido ban**, **Mainichi shinbun: hokkaido ban** [Mainichi Newspaper: Hokkaido Edition], and **Nihon keizai shinbun: hokkaido ban** [Japan Economic Newspaper: Hokkaido Edition], various issues, 9 May to 19 June 1981.

57. **Asahi shinbun: hokkaido ban** [Asahi Newspaper: Hokkaido Edition], 27 June 1981.

58. **Hokkaido shinbun** [Hokkaido Newspaper], **Asahi shinbun: hokkaido ban** [Asahi Newspaper: Hokkaido Edition], and **Yomiuri shinbun: hokkaido ban** [Yomiuri Newspaper: Hokkaido Edition], 1 March 1982.

the Iwanai Fishing Co-operative until after the Denchōshin permit was issued on 26 September 1982.

Power plant costs and project delay

The cost of projects is an important element in the assessment of times required to reach settlement over the development of energy projects. Project promoters are likely to delay negotiations with regional interests in situations where project costs are high and are expected to increase. Under those circumstances, promoters will reschedule project negotiations. They will prefer to postpone costly projects and will give priority to the development of alternative less costly projects.

The siting of Hokkaido Electric's Kyowa-Tomari project was substantially delayed because the power company originally under-estimated the costs involved in the implementation of the project. Slow electricity demand growth did not justify the development of the project. The installation of a large project to obtain economies of scale was expected to lead to a costly excess supply situation. Hokkaido Electric was not willing to pay the necessary compensation to win community approval and intentionally delayed the negotiating process.

The relatively small grid and slower demand growth in Hokkaido meant that any large energy project would supply a large proportion of Hokkaido's electricity. A smaller nuclear plant was considered economically infeasible. The company wished to develop a relatively large project in order to reap economies of scale. The development of a large project was, however, expected to reduce the reliability of the grid. An accident at that plant, for whatever reason, would threaten a relatively large proportion of the supply capacity. There was an increased risk that an accident would lead to major shortfalls in the supply of electricity. The grid in Hokkaido was not interconnected with the Honshu grid. There was also the added concern that it would not be possible to purchase electricity from Honshu in the event of a supply shortage.

The high economic costs of the project reduced the amount of compensation that Hokkaido Electric was willing to pay in order to reach a settlement with the Ganu community. This was particularly important in the context of opposition by the Iwanai Fishing Co-operative. Although the power company wished to use the port facilities at Iwanai for the construction and operation of the project, it did not assess accurately the structure of fishing rights and the importance of the Iwanai co-operative in the Ganu fishing industry. The use of the port required the acquisition of a section of the Iwanai co-operative's fishing rights. The power company was, therefore, put in a position of having to negotiate with the Iwanai Fishing Co-operative over the development of the project.

The Iwanai co-operative was the largest co-operative in the Ganu region. It was also the major marketing and distribution centre for the regional fishing industry. The power company was surprised at the relatively strong opposition by the co-operative. It did not expect that the co-operative, together with an ideologically based anti nuclear movement, could force mayor Nagahama to adopt a cautious policy which delayed the negotiations. Hokkaido Electric, in the initial costing of the project, did not take into account the existence of the Iwanai co-operative and the co-operative's ability to demand successfully large compensation claims for their approval of the project.

Given the high cost of the project, the payment of large amounts of compensation would have further reduced the economic viability of the plant. The power company was forced to reschedule its site development plans. It chose to give priority to the rapid implementation of the smaller Date oil-fired project. The Date plant was less costly than the Kyowa-Tomari plant in terms of construction cost, grid reliability, compensation claims and the time required to negotiate a settlement. Hokkaido Electric chose to minimise project cost in expanding supply capacity to meet expected electricity demand increases.

During the course of settlement, external events outside the control of the participants to the bargaining process injected instabilities into the negotiations. At different times, these instabilities acted to facilitate and impede the negotiations. The 1973 oil crisis increased the importance of developing nuclear power to ensure energy security. The national government responded by establishing the Three Laws and strengthening the nuclear administration. The policy changes at the national level improved the bargaining position of the power company. They increased Hokkaido Electric's compensation pool by providing direct subsidies to the region and attempting to allay concern about the risks involved in accepting a nuclear power plant.

While the oil crisis and the policy response to the crisis facilitated bargaining, other events, such as the establishment of a 200 mile economic zone by the Soviet Union and the threat of a terrorist attack on the project subsequently destabilised the negotiations. These events added to the compensation and management costs of developing the Kyowa-Tomari project. In response, the power company chose to institute major changes in the design of the project. It decided to alter the location of the project, so that it was solely within the Tomari village and to develop two nuclear plants. These modifications allowed for economies of scale and reduced the need to negotiate with the Iwanai co-operative over the transfer of fishing rights. They thus increased the amount of compensation which could be used to negotiate a settlement with Tomari. At the same time, the power company was in no hurry to develop the project as electricity demand was not expected to increase at a rapid rate. The change in the location of the project placed the power company in a relatively strong bargaining position and it was able to negotiate a settlement with the Ganu community.

Power companies are not likely to be willing to negotiate quick settlements with regional communities over costly projects. In situations where electricity demand is not expected to increase rapidly, promoters will prefer to delay project implementation. They will choose to minimise implementation costs and develop less costly alternatives to meet supply targets. At present, Japan is experiencing slow electricity demand growth and the cost of nuclear projects has risen. It would appear that nuclear project leadtimes may continue to be long as project promoters may intentionally delay negotiating settlements and may prefer to develop less costly thermal projects to meet supply objectives.

9

THE PREDICTABILITY OF PROJECT DELAY

This thesis set out to develop a way of explaining the leadtimes required to develop energy facilities in Japan. The particular focus was on identifying and analysing the determinants of the variation in times necessary to reach social and political agreement over the development of large-scale nuclear and fossil-fuelled power plants in Japan. The study examined the pattern of resistance to and support for energy power plants, the effectiveness of economic and other instruments in shortening delay and the effect of these factors on the relative rates of expansion of different types of energy facilities.

A key interest in the study was in the provision of a more reliable basis upon which to evaluate power plant leadtimes. Project leadtime is one important determinant of energy fuel demand. It influences the demand for energy fuels by affecting the rate of expansion of capacity and the mix of capacity embodied in that expansion. Consumers as well as suppliers have not been able to assess, with any degree of precision, capacity expansion targets and there is a need to develop ways of providing better assessments of project leadtimes.

Project development consists of site selection, electricity supply and demand forecasting, and an implementation stage which comprises public acceptance, licensing and construction. Despite the observed variation in total leadtimes, energy planners in Japan confront both predictable and unpredictable hurdles in project implementation. Public acceptance times are extremely variable and are the major source of unpredictability in the assessment of project leadtimes. The times required for licensing and construction do not significantly affect variation in project start-up times. Confidence in the assessment of leadtime increases substantially after public acceptance has been negotiated. The ability to make assessments of project leadtimes, therefore, requires the development of a way of evaluating public acceptance leadtimes.

The approach to the evaluation of settlement times developed in the thesis extends standard Cost Benefit Analysis (CBA) and argues that the explanation of public acceptance times requires an analysis of distributional effects and the effectiveness of compensation mechanisms. The settlement process involves bargaining over an acceptable distribution of costs and benefits expected to accrue from project development. Promoters will be required to compensate regional interests for losses expected to be incurred as a result of project implementation. Settlements are likely to take longer in a situation where compensation mechanisms do not operate effectively or cannot be easily established to take into account adverse effects of projects upon the parties participant to the settlement.

A model has been developed to provide some quantification of the importance of distributional effects on the variation in times required to win agreement over the development of energy projects. The results of applying this model to the analysis of settlement times suggest that the responses of both project promoters and regional communities are important determinants of public acceptance times. More specifically, the results suggest that the effects of: expected electricity shortages, the need to expand social and economic opportunities, opportunities in the rural sector, the need to provide public goods, the strength of leftist political party representation, the time period in which the settlement was conducted and the relative risks of different types of projects are major determinants of the variation in settlement times.

A major finding of the study is that there is a reasonable amount of predictability in settlement times given expectations about social, economic and political conditions at the beginning of the negotiating process. The evaluation of public acceptance times, however, can be improved substantially by monitoring social and economic conditions during the course of settlement. There may be a need to review earlier assessments of settlement times should expectations change during the negotiating period. The model also provides a reference point for evaluating the importance of other factors such as: the structure and use of political power, the skill with which bargaining strategies are employed, uncertainty about outcomes and changing expectations which will also affect settlement outcomes in a way which cannot be easily incorporated into quantitative analysis. The predictability of public acceptance times improves if one can assess these factors rather than merely observing statistical variables.

These determinants of leadtime variation in Japan appear to have a considerable amount of applicability to the analysis of factors which will influence delay in the installation of economic projects in general. The nature and relative importance of these determinants will vary, however, according to the nature of projects, the nature of interests participant to the settlement process, the structure of property ownership rights and the nature of political decision-making in the country where the particular project under consideration is located. There is, therefore, a need to test the applicability of these general influences with empirical evidence for a wide range of economic projects both in Japan and in other countries.

Toward a theory of project delay

Standard CBA provides a convenient theoretical departure point for the analysis of project delay. The technique specifies and then aggregates all relevant costs and benefits associated with project development. It suggests that projects should be developed, on efficiency grounds, if aggregate benefits exceed costs, or there is an expected economic surplus, and individuals disadvantaged by the project could, in principle, be compensated by those who were advantaged by it and still remain at least as well off as before the change. This approach would rank projects in terms of economic efficiency criteria and would yield a theoretical scheduling of project development; projects being ordered in accordance with net benefit-cost ratios.

This approach is useful for identifying high return projects independently of the management of compensation requirements and other 'non-economic' factors. If it is assumed that compensation is delivered appropriately and settlements are instantaneous and that licensing and construction times are relatively constant, it would be expected, other things being equal, that the highest yielding project and, therefore, the project selected first would start operation before the second project and so on. Under these conditions, the schedule of project commencement would be closely associated with the schedule of project completions.

In reality, however, there is a need for a settlement process whereby project promoters will be required to compensate regional interests and, hence, social and political factors which are not included in promoter cost-benefit calculations will influence the schedule of project completions. The provision of a reliable basis for assessing project delay, therefore, requires analysis of the social and political factors that influence the effective management of compensation requirements.

The need for a settlement process arises out of a disparity between the value of a project to promoters and its value to regional interests. The process is characterised by bargaining over who wins and who loses from project implementation. Bargaining occurs at many levels of government and between a multitude of actors including the national government, regional electorates, power companies, property right owners and other interests. Project developers will be required to compensate regional interests for losses expected to occur in order to reach a settlement.

Compensation mechanisms exist or may have to be established for redistributing some of the spoils of project development from promoters to regional interests in order to effect a settlement. Compensation can be paid through institutional and political mechanisms and can take a variety of forms. There are arrangements by which project developers pay compensation directly to interests, such as those possessing legally recognised property rights. There may be mechanisms by which other interests, such as prefectural or state governments, pay subsidies to local governments. There can also be arrangements by which redistribution takes place from national communities, who expect to benefit from projects,to local communities to compensate for losses expected to be incurred as a result of project development. The mere existence of compensation mechanisms does not necessarily increase the ease of settlement and predictability of settlement times. The extent to which it does will depend on the effectiveness with which compensation mechanisms and procedures facilitate a redistribution of benefits appropriate to the structure of costs expected to be incurred from the project development.

The effectiveness of compensation mechanisms is likely to be related to the pattern of distributional effects, uncertainty about outcomes, the allocation and use of bargaining power, the success of strategies employed by various interests and changing expectations of parties during the course of settlement. The evaluation of settlement times requires an analysis of the impact that these factors will have on the ease with which compensation can be managed. Delay is likely to occur in situations where compensation mechanisms are not operating effectively or cannot be easily established.

The distribution of costs and benefits will be one important factor influencing the ease with which compensation is managed. The extent of the divergence in the value of a project between promoters and regional interests may not be reflected adequately in simple costs and benefits as used in conventional CBA. These simple costs and benefits may not reflect the true value that is placed on projects by interests participant to the settlement. Distributional effects may not be neutral; project promoters and regional interests may, for a variety of reasons and under different circumstances, evaluate costs and benefits differently. The distributional effects of projects will be important in determining the extent to which benefits exceed costs or the economic surplus which is available for redistribution from project promoters to regional interests. Project implementation is likely to be delayed in situations where there is little surplus available for redistribution and where compensation mechanisms are not and cannot be effectively tuned to take into account adverse effects consequent upon a particular project development.

Even if compensation mechanisms are able to cope adequately with distributional effects, the speed of settlement may also depend on the spread of costs and benefits among or within organised interest groups. Settlements are likely to be contentious if, for example, certain regional interests are expected to make large gains in the form of compensation and other benefits at the expense of large losses by others. Under those circumstances, it may be more difficult for project developers to structure and institute the necessary compensation payments and this may influence the speed at which community approval is given.

The costs and benefits expected to accrue from a particular project development may not be known with certainty. Indeed, generally, there will be some uncertainty as to the expected social and economic value of projects. Compensation management may be more difficult if participants to the settlement are risk averse and attach a large weight to the costs of uncertainty. For example, project promoters may be uncertain as to the expected increases in demand for project output and, therefore, may not be willing to pay large amounts of compensation to regional interests. They may prefer to develop projects with smaller compensation requirements.

The degree of difficulty in reaching settlements may not be reflected simply in the distribution of costs and benefits even if they are evaluated accurately. Decision making processes may not be structured in a way which facilitates the use of compensation mechanisms. Certain interests, who expect to gain or lose from project implementation, may possess a disproportionate share of political power or may be in conflict with other interests over unrelated issues. The management of compensation is likely to be more difficult in situations where project developers do not or cannot take into account conflict between interests even if that conflict is independent of the social value of projects.

The skill with which various interests participant to the settlement employ bargaining strategies might affect the ease with which compensation can be executed. Bargaining strategies will include economic, political, technical and informational strategies or some combination of them. Whatever the strategy employed, it will be designed to alter the expected costs and benefits of projects to various interests and their bargaining positions. For instance, a technical strategy, such as project design modification, may reduce the adverse effects on particular regional interests and may obviate the need to negotiate with those interests in winning approval for project construction.

The revision of expectations about the value of projects may also affect bargaining outcomes. During the course of settlement, changes may occur and lead to a divergence between what was expected to occur and what actually occurs. Preferences may not be stable and interests may consequently revise their expectations about the costs and benefits of projects. Economic, political or policy related changes may introduce instabilities into bargaining. These changes may alter benefit-cost ratios and the bargaining positions of interests participant to the settlement and may, therefore, influence the ease with which compensation requirements can be managed.

The evaluation of project delay requires extending standard CBA. The model developed in this thesis focusses on the distributional effects and, hence, the importance of management of the compensation process in evaluating why settlement for some projects takes longer than for others. The assessment of public acceptance times requires going beyond the simple aggregation of costs and benefits to analyse the social, political and institutional factors influencing bargaining outcomes, between promoters and regional interests over the development of economic projects.

Evaluating energy project leadtimes in Japan

A key objective of this study was to develop ways of evaluating the leadtime required to locate and construct energy facilities in Japan. Energy power plant leadtimes have become longer and are highly variable and casual empiricism might suggest that these characteristics would prevent any general assessment of leadtimes. An important finding of the thesis is that there is more predictability in the evaluation of power plant leadtimes than is intially apparent. There are methods which can be developed which will allow a systematic evaluation of energy project leadtimes.

Identifying sources of unpredictability

The placement of power stations involves site selection, electricity supply and demand analysis and an implementation process involving public acceptance, licensing and construction. Energy planners face both known and unknown hurdles in the development of energy facilities. The major source of unpredictability stems from variation in times at the front end of project implementation at which point social and political agreement is reached. The back-end of the siting process, which includes licensing and construction, does not appear to be a major contributor to the variation in energy power plant leadtimes.

Planning for project development involves the selection of a minimum private cost site from a pool of candidate sites when electricity supply and demand forecasts reveal the need for additional capacity. The inclusion of a site into a candidate site pool will be based on criteria such as: the existence of flat and stable terrain, the availability of cooling water, population density, access to transportation routes and proximity to load centres. Power companies will make final site choices by trading off the costs of achieving respective site selection criteria.

After power companies have made their choice of site, they will then attempt to reach agreement with relevant electorates over the implementation of the projects. Public acceptance involves bargaining between and among project promoters and regional interests over an equitable distribution of the gains and losses expected to be incurred from the developments. It only requires that broad agreement be won on the development of the projects. The instability of bargaining outcomes is a major contributor to the variation in total power plant leadtimes in Japan.

Companies will then be required to license projects. Licensing involves government balancing the risks and benefits of developing projects. It is mainly concerned with finer points, such as the actual completion of negotiations over property right transfer and the issue of various permits. The time taken to settle these finer points is highly variable because negotiations regularly carry over into the licensing process and because site-specific characteristics can require different permits to be issued. The licensing stage is, however, relatively short and consequently does not appear to be a major determinant of leadtime variation.

In the final stage of project development, power companies try to minimise the cost of constructing projects subject to manpower and engineering constraints. The construction stage involves preliminary construction which prepares the site for construction and the stage of construction proper. All bargaining processes must have been complete prior to the commencement of construction proper. In contrast to earlier stages of project development, construction is less subject to economic and political bargaining processes. Construction time are relatively long, but display considerable stability and do not appreciably influence variation in total leadtimes.

At any one point in time, power companies will have projects that are in public acceptance, licensing and construction stages. Confidence in the assessment of power plant leadtimes increases substantially after public acceptance has been negotiated. In Chapter 2, it was shown that licensing and construction times were a predictable element in calculating power plant leadtimes in Japan.

Evaluating public acceptance times

Public acceptance times appear to be less predictable. The existence of institutionalised compensation and property right transfer arrangements, which redistribute some of the gains from project developers to regional interests, does not appear to guarantee consistency in the time necessary to win approval for the implementation of power projects. A critical element in the provision of a more reliable basis upon which to evaluate overall power plant leadtimes in Japan is the analysis of the factors that determine the effectiveness of compensation mechanisms in reaching social and political agreement over the development of energy projects.

The ease with which project developers can manage compensation requirements will be influenced by the pattern of the distribution of costs and benefits, uncertainty about outcomes, the structure of decision making, the skill with which bargaining strategies are employed and changing excpectations in the course of settlement. A major finding of this thesis is that a systematic analysis of these factors can assist in understanding why agreement for some projects takes longer than for others and can provide a relatively sound objective basis upon which to evaluate the variation in settlement times.

The evaluation of settlement times requires an analysis of the divergence in the expected value of a project between project promoters and regional interests. The extent of that divergence will determine the economic surplus which is available for redistribution in order to affect a settlement. Compensation mechanisms are likely to work more effectively in bargaining environments where there is a large economic surplus available for redistribution and where those mechanisms are or can be adequately tailored to the structure of compensation claims consequent upon a particular project development.

The structure of the bargaining environment will be determined by the value that project promoters and regional interests place upon project developments and their responses to those developments. An important conclusion of the study is that there is a substantial amount of predictability in the pattern of responses to the development of energy projects and the impact of those responses on the variation in settlement times. The demand for project sites will be influenced by, amongst other things, the need for promoters, such as power companies and the national government, to meet expected electricity demand increases. The supply of projects will be influenced by such things as: expectations about social and economic opportunities, the size of the rural sector, the ideological orientation of communities, social attitudes towards preservation of the environment and the relative risks of different types of energy facilities. It is possible to provide some measure of the importance of these influences and their impact on settlement times through regression techniques. The development of quantitative models can be of use in the evaluation of settlement times.

The settlement process takes time and therefore expectations about costs and benefits at the beginning of negotiations as well as during the course of settlement are likely to be important in the assessment of public acceptance times. A major finding of the study, which was discussed in Chapter 4, is that predictive models which incorporate information about expectations at the beginning of the settlement process explain 55.0 per cent of the variation in settlement times and, therefore, offer a considerable amount of predictability in public acceptance times. Expectations may change during the course of settlement and the assessment of public acceptance times can be enhanced considerably if social and economic conditions during the course of settlement are monitored carefully. Evaluative models which consider social and economic conditions prior to the commencement of settlement as well as during the course of settlement explain 76.0 per cent of the variation in public acceptance times.

The evaluation of settlement times requires an analysis of the need for project promoters, such as power companies and the national government, to develop additional projects to meet expected electricity shortages. These shortfalls can be measured by subtracting expected three year capacity from expected five years electricity demand. Expected shortages during the course of settlement appear to be a more important determinant of settlement times than expectations at the time when power companies declare their intentions to locate projects at particular locations. Power companies facing large expected electricity shortages will wish to develop sites relatively quickly. They will be more willing to and capable of compensating regional interests for losses expected to be accrued as a result of those developments.

The response of the national government will also be important in evaluating settlement times. The national government is concerned with meeting expected electricity shortages in broader regional electricity spheres. It is a critical factor in the settlement process in that it grants Denchōshin approval which allows the licensing stage of project development to commence. In situations where project demand is high, the national government is likely to be more willing to give its endorsement to power station developments.

An interesting finding of the study is that the national government appears to place more emphasis on initial packages compared with subsequent packages in periods of excess demand. It appears to presume that power companies will attempt to locate less costly subsequent packages, and, therefore, appears to be more willing to give approval for initial packages which will add significantly over the longer term to existing capacity.

The responses of regional electorates also requires careful consideration in the evaluation of settlement times. This entails analysing whether the structure of the community response will be more or less conducive to accepting energy power stations given information about the willingness of project developers to deliver compensation requirements. Regional interests who expect to be affected adversely by project development are not likely to give their approval for those projects if project developers are not willing to compensate them adequately.

Energy facilities are likely to be accepted more readily in areas where per capita incomes are rising relatively rapidly. Under these conditions, communities would be experiencing rapid development or even an economic boom. Having experienced the benefits associated with this development, communities may wish to see further expansion of those benefits. At the same time, there may be a lag in noticing the environmental impairment associated with that development. Consequently, electorates experiencing rapid income growth may place less emphasis on environmental quality and, therefore, may be more willing to accept energy projects.

The importance attached to environmental quality appears to be a stronger influence in lengthening fossil-fuelled project compared to nuclear project settlement times. In Japan, fossil-fuelled projects tend to be located in relatively high income areas close to major consumption centres. In contrast, nuclear projects are generally located in lower income areas away from major population centres. Regional electorates are likely to be less enthusiastic about accepting fossil-fuelled projects which will be seen to add to existing levels of pollution. As incomes are relatively high, they will place less emphasis on the incremental income benefits expected to accrue from such developments. A critical implication of this result is that the risk of nuclear projects may be given less weight by electorates which are experiencing rapid growth and wish to see that growth continue.

The response of the rural sector appears to be an important determinant of settlement times. Settlement times are likely to be longer for nuclear plants relative to fossil-fuelled plants in situations where the size of the rural sector, as measured by the ratio of primary income per capita to total prefectural income per capita, is relatively large. The rural sector appears to be more concerned about the potential hazardous effects of nuclear power stations as compared with fossil-fuelled plants. They tend to attach more riskiness to nuclear power projects because of a concern about the adverse effects that a large-scale accident might have on factors of production such as land and water and because of the longer term nature of those effects.

The attitude of primary producers may also differ with the type of package that is being developed. Rural interests tend to resist subsequent packages more adamantly than initial packages. They are concerned about initial projects because of a lack of familiarity with the environmental hazards involved in the development of power plants. The rural sector accepts initial packages because of expectations that they will benefit in terms of expanded income and employment opportunities from those projects.

The construction of initial projects, however, delivers little direct benefit to the rural sector compared with the non-rural sector. It, therefore, appears to change its expectations about the value of subsequent packages which will be expected to further impair the environment.

The ability of local government to supply public goods, as measured by the ratio of the value of tax revenues from regional sources to the value of expenditure on public goods, will also affect the ease at which settlements can be reached over the development of energy projects. Local government tends to accept subsequent packages more readily when financial hardships are expected. Local electorates accrue large financial benefits in the form of fixed asset and other taxes with the construction of initial projects. These taxes are used to develop social overhead capital such as roads and hospitals. After the construction of initial projects has been completed, those taxes decline despite a need to maintain expenditure on such public goods. They, therefore, appear to be more willing to accept subsequent packages.

The ideological structure of prefectural communities is an important explanator of settlement times. The ratio of Japan Socialist Party (JSP) and Japan Communist Party (JCP) prefectural assembly seats to total assembly seats can be used as a measure of the strength of leftist party representation in regional electorates. Nuclear projects will take longer to implement than fossil-fuelled projects in areas where there is relatively high leftist representation in prefectural assemblies. Leftist political parties tend to be concerned about the risks of nuclear projects and sensitise the public to those risks. In contrast, leftist political parties place less emphasis on the risks associated with fossil-fuelled projects, and as was illustrated clearly in the Matsushima case may even support coal-fired projects in order to provide assistance to the domestic coal industry. The lack of ideological conflict over the siting of fossil-fuelled projects appears to be an important reason for their relatively shorter public acceptance times.

The structure of local community and social attitudes and trends which may be prominent in particular time periods also need to be considered in the context of evaluating settlement times. During the period from the late 1960's to the early 1970s, pollution problems emerged in Japan and emphasis started to be placed upon preserving the environment and improving the level of welfare. The community in Japan started to attach less importance on the benefits associated with rapid economic development. Consequently, there was less community willingness to accept environmentally hazardous power projects from the early 1970s.

An interesting finding of the study with respect to the community response to the riskiness of energy power plants is that it is not the nature of the technology itself which is the critical determinant of settlement times. The importance attached to projects with different characteristics will depend on social, economic and political conditions. The assessment of the response of communities toward projects, therefore, requires going beyond technological features of power plants and requires an analysis of economic and political characteristics of regional electorates.

The use of quantitative models in the analysis of settlement times does have limitations which need to be taken into account when evaluating the results of the study. These limitations are a function of data availability and measurement problems. For example, the variable which was used to measure expected electricity shortages presumes that project promoters base capacity expansion targets on the difference between expected five year electricity demand and expected three year capacity. Although five year electricity supply and demand forecasts were the only data available, project promoters might formulate siting plans on longer time horizons and this may distort the results of the thesis. These measurement problems need to be given consideration in the use of econometric models developed in the study for evaluating public acceptance times.

A critical conclusion of the study is that despite these shortcomings there is a predictable pattern of response by power plant promoters and regional interests toward the development of energy facilities. These influences are quantifiable and a model can be developed to provide some statistical measurement of the importance of these influences on the variation in energy construction start-up times. The statistical results presented in Chapter 4 do provide a reasonably objective basis upon which to evaluate settlement times. The models explain a relatively high proportion of the variations in public acceptance times. They are statistically significant and relatively robust. An application to unlicensed nuclear projects suggest that they can be used in evaluating public acceptance times. As noted in the case study chapters, the models yield estimates of settlement times which were equal to or better than power company assessments.

The statistical models developed in this study are useful because they provide a set of general determinants which can be used in assessing public acceptance times for energy projects in Japan. The data used in the models is readily available and, therefore, it is relatively easy to generate estimates from the regression equations. The models provide a way of systematically examining general determinants of settlement times and deriving estimates which can be used in evaluating the times necessary to win agreement over the development of energy projects.

The assessment of settlement times does not, however, end at the stage of gathering an array of numbers and calculating estimated times from mathematical equations. The residuals of the models vary quite significantly and this suggests that other factors need to be considered in the context of assessing settlement times. Variation in the residuals implies that estimates generated by the model can either under or over-estimate public acceptance times even though the model in general provides a relatively good fit. Quantitative approaches to the assessment of public acceptance times make a number of important assumptions about the nature of other factors such as: the structure of regional decision making, the effectiveness with which bargaining strategies are employed, uncertainty about outcomes and changing expectations. The importance of these factors also needs to be considered in the evaluation of settlement times.

The case history studies presented in the thesis provide a useful way of assessing the relative importance of these factors and illustrating the possibility of supplementing econometric models with qualitative analysis in the evaluation of settlement times. The models provide estimates of settlement times for each observation and line those estimates up against actual or observed public acceptance times. The residual, the difference between the actual and predicted times, acts as a summary measure of the importance of factors such as: changing expectations, which are not easily susceptible to quantification yet may influence bargaining processes in a complex way. The factors need to be explored in providing a more complete basis upon which to evaluate settlement times than could be provided simply by relying on estimates derived from econometric models.

The statistical models developed in the thesis presume that the adverse effects of projects are spread flatly or evenly across interests participants to the settlement. An important finding of the case study analyses is that in the development of projects some regional interest is usually expected to make large gains at the expense of large losses expected to be accrued by others. Of particular importance is the relative impact of energy projects across administrative boundaries. In Japan, fishing co-operatives located in areas adjacent to those accepting projects argue that they will incur large losses from project development and invariably present stiff opposition. Resistance by interests outside administrative units accepting projects is one important pattern of response to the development of those projects.

The extent to which an uneven spread of costs and benefits from project development will cause variation in delay will depend on the relative impacts and strengths of interests participant to bargaining. As was clearly illustrated in Chapter 5, large interests who expect to be affected adversely by project development can substantially delay settlement processes. Economic interests whose production is relatively high and who are experiencing a boom in economic activity will offer considerable resistance to the implementation of projects. Redistributive mechanisms are not likely to function effectively in situations where large and powerful interest groups are operating in the regional economy.

The spread of costs and benefits within interest groups can also influence the speed at which settlements can be reached. A critical factor in assessing the ability of interests to oppose projects successfully is the extent to which the adverse effects of projects are evenly spread within interest groups. Interests groups which specialise in the production of economic output are likely to be effected in the same way by projects and, therefore, will be able to mobilise resistance to projects more effectively. In situations where the effects of projects benefit some interests at the expense of others, interest groups are likely to be less capable of mounting sustained resistance movements. Under these conditions, it will be more difficult for interests opposing projects to rely on resistance from those who expect to gain from the implementation of projects.

Even if the structure of adverse effects both across and within interests are fully taken into account, the evaluation of settlement times requires considering the degree of uncertainty prevailing in bargaining environments. Uncertainty can increase the costs of projects and, therefore, reduce the economic surplus which is available for redistribution. Hence, a high degree of risk averseness can impede the development of compensation and property right transfer arrangements.

Uncertainty can influence the willingness of promoters to develop energy projects. As illustrated in Chapter 7, project promoters may be uncertain about the costs of project implementation in terms of: the possibility of high levels of excess capacity, the costs of community compensation and property right transfer and political costs such as electoral implications of pressuring regional interests into accepting projects. An important finding of the study is that promoters facing uncertainty are likely to respond by delaying certain projects and giving priority to the development of less costly projects. The evaluation of settlement times for particular projects therefore requires an assessment of the degree of uncertainty prevailing at alternative locations and the impact of this uncertainty on the willingness of power companies to re-schedule site development plans.

A major assumption of the quantitative models developed in the study is that the structure of decision making in the regional political organisation impacts on bargaining in the same way at all locations. The regional decision-making structure may, however, vary and, therefore, the assessment of settlement times requires an analysis of the impact of the structure of decision-making on the management of redistributive mechanisms. The regional political organisation is important in settlement processes because it plays a role in creating a bargaining environment which facilitates negotiations between project promoters and regional interests. The case study analysis suggests that the structure of political conflict and institutional access to power are critical factors influencing the variation in project settlement times.

Political conflict at the regional level, even if it exists for reasons which are independent of projects, can affect the management of compensation. As noted in Chapter 5, intense factionalism within ruling parties can substantially delay settlement processes. Opposition factions may see the development of energy projects and the subsequent economic benefits arising from those projects as weakening their political position vis-à-vis ruling factions. Those in ruling factions may be concerned about the political and electoral implications of developing projects too quickly and this may weaken their role in facilitating bargaining processes.

The degree of institutional access to key decision-making centres may also affect the ability of regional government in playing a mediatory role in dispute settlement. As illustrated in Chapter 8, opposition groups with institutional access, such as that acquired through membership of regional government committees, can immobilise or prevent the leadership in the regional political organisation from mediating in siting disputes and can substantially erode the bargaining positions of project developers.

During the course of settlement, promoters and opponents will employ a variety of strategies to improve their bargaining positions. The quantitative analysis in the study assumes that the pattern and effectiveness of these strategies is similiar in all circumstances. The evaluation of settlement times, therefore, requires an analysis of the nature and success of bargaining strategies employed by participants to the settlement process. These strategies include informational, economic, political and technical strategies and are designed to facilitate or impede bargaining by changing the value of projects and the allocation of bargaining power.

Interest groups opposing project development attempt to prevent or destabilise bargaining by sensitising the public to the risks involved in energy projects forming alliances and attempting to gain institutional or electoral access to decision making processes. Project promoters respond by trying to address risk issues and splitting or isolating negative agents from bargaining processes. The evaluation of settlements requires monitoring the development of these strategies and assessing their impact on bargaining processes.

Opposition groups usually attempt to impede bargaining by heightening concern about the environmental risks associated with project developments. This is achieved by conducting demonstrations, distributing pamphlets and appealing to interests at the regional and national levels. A key element in this strategy is attempting to increase the expected costs of projects to regional publics and other targeted interests. Opposition groups see this tactic as important in trying to create resistance and stimulate communities to demand larger amounts of compensation, thus increasing the costs of bargaining to project developers.

In many cases, interests resisting project development will join forces or form alliances with each other to improve their bargaining positions with project promoters. Two patterns of alliance can emerge in siting disputes in Japan. The first are alliances between economic interests such as between fishing co-operatives. The second is the alliance between economic interests and ideological interests such as leftist political parties and their affiliates. The ability of members of these alliances to delay bargaining will depend on the impacts of projects on interests within the alliance, motivations, ideological compatibility, tactical goals and established relationships with other interests outside the alliance. Those interested in providing assessments of public acceptance times will need to consider the type of alliance which are formed and the ability of those alliances to delay bargaining.

An interesting conclusion that can be drawn from the case study analysis is that economic-ideological alliances may be less capable in general than economic alliances in opposing project development successfully. As noted in Chapter 6, the weak position of fishing interests led them to form an alliance relationship with a leftist based movement. The economic-ideological alliance was not, however, capable of substantially delaying negotiations because some fishing interests saw the costs of such opposition as being relatively high in terms of ideological incompatibility and the possibility of reduced finances from the prefectural government. On the other hand, economic interests which were discussed in Chapters 5 and 8 did not form alliances with ideological interests. They saw their positions as being relatively strong because the impact of energy projects was large and spread relatively evenly across their membership. They did not perceive any need to join forces with other interests as they could mobilise substantial resistance unilaterally. The lack of willingness to enter into alliances with ideological interests may be a good measure of the strength of economic interests opposing project development.

Interests which do not have institutional or electoral access to decision-making may seek to acquire access in order to improve their bargaining positions. Success in this objective can prevent regional government from assisting in settlement processes and can even lead to opposition by regional government to projects. A key finding of the study is that projects can be delayed and may even be abandoned if large and powerful interests , which are opposed to project development, are capable of gaining electoral access to regional government.

During the course of settlement, project promoters will respond to the emergence of resistance and will develop strategies which will facilitate the use of redistributive mechanisms. An underlying objective of promoter strategies is to create a bargaining environment in which negotiations can take place by weakening resistance and minimising outside interference on the conduct of negotiations. There is a general pattern to the strategies employed by promoters and it is important to monitor the nature and success of these strategies in the evaluation of settlement times.

An important strategy employed by project promoters is to address the risk issue. There is a variety of methods used in alleviating concern about environmental risk. These include: lecture series and expert inquiries but the most important appears to be the use of the demonstration effect. Promoters usually take certain community interests to regions where projects are under construction or operating. This strategy attempts to show those interests that there are large expected benefits from accepting projects and that these benefits offset any costs that might also be incurred.

A second strategy generally employed by project promoters is isolating negative agents from negotiating processes so as to weaken their bargaining positions. This is particularly important in situations where ideological interests are influencing property right owners and where particular property right owners are strongly resisting project development. Power companies try to mobilise the regional political organisation to form regional committees and have property right owners and other interests participate in those committees. In some cases, they may also modify project design so as to reduce the impact of projects on affected parties with veto power and thereby erode their bargaining positions. In other cases, promoters will commence negotiations with weaker interests so as to put pressure on stronger interests opposing project development.

An important conclusion of the study is that the skill with which these bargaining strategies are employed in different project developments does not substantially affect estimates generated by statistical models, developed in the thesis. As noted in Chapter 5, power companies usually attempt to mobilise the regional political organisation to facilitate negotiations. Chubu Electric was very skilfull in utilising the regional political leadership to weaken and isolate resistance to the project. Even though the company had learnt several valuable lessons from its earlier Ashihama experience, the skill with which it developed siting strategies does not appear to have been a major factor speeding up the settlement process.

The statistical models developed in this thesis also make an assumption that expectations are changing in a constant direction during the settlement process. Expectations may, however, fluctuate. A critical element in the evaluation of settlement times is monitoring expectations and changes in those expectations. Changes in expectations can arise because of such factors as: changes in energy policy priorities, electricity market conditions, and policies of other countries. These changes can influence the value of projects and therefore can affect the settlement process by either increasing or decreasing the benefits which can be redistributed in order to win approval from affected parties.

An interesting finding of the case study discussed in Chapter 7 was that monitoring changes in national energy policy can be very important in the evaluation ofsettlement times. The Matsushima case illustrated the increased importance of coal-fired projects after 1973 in order to reduce dependence onimported oil. The re-direction of energy policy towards stressing the development of non-oil projects allowed the Electric Power Development Company and MITI to reach a settlement with Kyushu Electric and MOF over the implementation of the project. The increased security value of the project allowed the promoters to develop transmission lines which reduced the concern of Kyushu Electric and MOF about the economic viability of the project.

An important assumption of the statistical analysis in the study is that the nature of compensation and other financial instruments, such as subsidies, used in negotiating settlements is the same in all situations and that those redistributive mechanisms are equally effective in the resolution of energy project siting disputes. The case study analysis suggests that the type of redistribution does have a bearing on the extent to which project promoters can shorten settlement times. The assessment of public acceptance times does require a consideration of the nature of compensation and its impact on the negotiating process.

An important conclusion of the case studies is that indirect or broad based subsidies in the form of prefectural grants and subsidies provided under the provisions of the Three Laws are used to create regional public support for projects against interest groups which oppose project development. As illustrated in the Ashihama case, broad based subsidies do not appear to be effective in shortening delay when large and powerful interests oppose the siting of projects. The Matsushima case suggests that subsidies are only likely to be effective in reducing opposition when they are structured to provide direct benefits to interests which have property rights or are in strong bargaining positions.

A critical conclusion of this study is that there are ways of evaluating energy project leadtimes in Japan and that there is more predictability in leadtime variation that might be expected from casual observation. The major stumbling block to providing reasonably accurate assessments is found in the public acceptance stage of site development. The quantitative models developed in this study do provide a useful basis upon which to make some objective evaluation of settlement times. There is, however, a need to go beyond econometric techniques and consider explicitly social, political and institutional factors in providing a more complete assessment of settlement times.

General applicability to economic projects

The major conclusions of the study appear to have some broad applicability to the evaluation of public acceptance times for other energy and non-energy projects in Japan as well as economic projects in other countries. The important determinants of settlement times for energy projects in Japan appear to be of more general use in the assessment of the degree of difficulty in the placement of economic projects. The extent of this general applicability can only be assessed accurately by considering other economic projects in Japan and elsewhere in the light of the framework developed in this thesis. It is, however, possible to make some broad observations which may be suggestive of the scope for future research in the evaluation of delay in project development.

The leadtime to develop economic projects is one measure of the degree of ease or difficulty a country faces in achieving social and political objectives which require the development of those projects. The analysis of delay in project implementation is therefore critical to the formulation of policy in so far as policy makers and others interested in policy will need to know the extent to which objectives can be accomplished.

Standard CBA is useful for ranking projects in terms of economic efficiency criteria and this approach assists in the identification of high return projects which are developed first. This approach ranks project development independently of compensation requirements and other non-economic factors and therefore assumes zero implementation costs in reaching settlements over the development of projects. Policy makers will be interested in the implementation costs of developing certain projects as this may affect their ability to achieve objectives. The social and political costs involved in reaching agreement over projects will need to be set alongside other more narrowly defined economic costs and assessed in project policy formulation.

The conceptual basis of the framework developed in this study extends CBA and considers bargaining over the distribution of costs and benefits expected to accrue as a result of project development. All economic projects will benefit some interests and will confer costs on others. There is, therefore, a need to consider the distribution of costs and benefits and the adequacy of redistributive mechanisms in examining why some projects take longer to implement than others.

There are several criteria which can be used to assess the degree of general applicability of the framework developed have in the assessment of delay in project implementation. These include: the nature of projects, the nature of interests participant to the settlement process, the structure of property right ownership, the existence of institutionalised redistributive mechanisms and the structure of political decision-making.

The conclusions of the thesis are likely to be of relevance in assessing the determinants of delay for a wide range of environmentally hazardous projects in Japan and elsewhere. These may include petro-chemical plants and other public projects such as airports and highways. The environmental impacts of projects may differ; some projects may impair the physical environment while others may do more damage to the social environment. Independently of the effects, there will be a divergence in the value of projects between project promoters and those interests being asked to accept projects and, therefore, project implementation will require bargaining over an equitable distribution of costs and benefits expected from the project. It would be of interest to extend the coverage of the thesis and to undertake cross-country comparisons of bargaining over the implementation of economic projects. Such studies should shed light on the nature of bargaining in different countries and the impact on project implementation times.

The settlement process requires that promoters compensate interests being asked to give their concurrence to project development. Irrespective of the nature and location of the project, there will be a set of general determinants which wil influence the management of compensation and other redistributive mechanisms. On the site demand side, the importance attached to project output to supply markets will be an important factor influencing the promoters response to developing projects. On the site supply side, general determinants, such as expectations about future social and economic opportunities,the structure of political party representation and the ability of local government to supply public goods, will influence the community response to accepting projects. These general determinants can be used in assessing the ease with which redistributive mechanisms can be established or used in winning approval for project development.

The structure of property ownership rights will also determine the degree of general applicability of the framework developed in this study. Japan is unique in respect of the existence of fishing co-operatives whose legally recognised property rights need to be relinquished in developing economic projects which have an impact on the marine environment. There is, however, a structure of property rights for land owners which will be consistent within Japan and the development of any economic project in Japan will require the relinquishment of those rights. In other countries, there are likely to be interests who possess property rights and their consent will be required in the development of economic projects. There is, however, a need to compare more fully the structure of property right ownership in Japan and other countries and its impact on settlement processes involved in developing economic projects.

The existence of institutional arrangements which facilitate compensation and property right transfer will also influence the broad applicability of the approach in this study to analysing delay in reaching agreement over economic projects in general. Institutional arrangements which exist for power plants will also exist for other types of projects in Japan. Similar arrangements do not appear to exist in other countries, such as America, Europe and Australia. An important future area of research is the analysis of the extent to which established institutional arrangements in Japan facilitate settlement of economic projects compared with other countries where project developers are required to establish their own independent compensation mechanisms.

The extent to which the settlement process requires bargaining between project promoters and regional interests will also depend on the broad structure of decision-making and national-regional relations. Regional electorates have veto power over projects in Japan and, therefore, their agreement must be obtained in developing economic projects of any kind. This will apply to other democratic countries where regional electorates have veto power over the development of economic projects in their localities. In countries where authoritarian or communist regimes rule, the responses of regional electorates to economic projects are likely to be far less relevant in bargaining over the development of economic projects. There is considerable scope for undertaking comparative studies on the impact of the structure of national-regional relations and decision-making more generally on the delay in the implementation of projects.

Bargaining between promoters, such as the national government and those given responsibility to develop projects over the gains and losses of project development may, however, be an important determinant of delay in non-democratic regimes. The framework developed in this study might have to be modified to take into account the political structure of bargaining environments in certain countries. The impact of bargaining between private and governmental interests at the national level on project delay was addressed in the study, but it would be useful to develop research on countries, such as Korea and Taiwan, where bargaining at the national level appears to be more important in the determination of project leadtimes.

This study focussed on the social and political factors influencing variation in public acceptance times for the development of energy projects in Japan. It only considered briefly the question of delay in the licensing and construction stages of project development. The justification for this emphasis was that licensing and construction times for energy projects did not significantly influence the variation in overall power plant leadtimes and, therefore, could be taken as given in the evaluation of total leadtimes. There is a need to examine this assumption in the assessment of overall leadtimes for economic projects in general.

In Japan, the nature of permits necessary for energy projects is likely to differ for other economic projects. For example, some licences required for the development of nuclear projects will be restricted to those projects. On the other hand, similar licences and permits are likely to be required in other countries developing nuclear projects. An important issue which could provide scope for future research would be the impact of the structure of licensing processes on the variation in leadtimes for economic projects in general.

Construction times for energy projects in Japan are relatively stable. An important factor explaining this stability is likely to be the nature of labour contracts in Japan which allow power companies to plan for strikes which occur in spring each year. Labour relations in Japan, at least for large construction companies, is based on lifetime employment and, therefore, there is a considerable degree of stability in labour-management relations. It is likely that construction times for other large-scale economic projects in Japan would be relatively stable given the institutional characteristics of labour markets. A useful and interesting question which could be addressed in future research would be the extent to which industrial relations problems in other countries affects the variation in construction times for large-scale economic projects. It is possible that project developers in other countries would not face a similar degree of predictability in project construction times as the Japanese do.

In the study there was an emphasis on the delay in locating initial as opposed to subsequent packages. While the statistical analysis addressed both categories of plants, the case studies did not tackle the question of why public acceptance times for subsequent packages are generally shorter than times for initial packages and why some subsequent packages take shorter times than others to implement. There is a need to supplement the study with research on the impact of initial packages on the regional political economy. Such an analysis would provide further insights into the nature of bargaining processes involved in siting subsequent packages and their impact on settlement times.

The framework developed in the thesis appears to have a considerable amount of applicability to the assessment of delay in project implementation in general. There is, however, a need to use the major conclusions of this study as a starting point for the analysis of delay in the implementation of economic projects. There will be a need to undertake case studies, such as those outlined above, for other projects in Japan and elsewhere in order to consider the extent to which the major determinants of project delay in Japan are of use in evaluating economic project leadtimes in general.

Implications for energy forecasters

The results of this study have important implications for those in the energy fuel trade attempting to assess capacity expansion targets in Japan and in other countries. The leadtime required to develop energy facilities is a major determinant of the rate of expansion of capacity. The assessment of leadtime is, therefore, critical in making judgments about the ability of a country to achieve its capacity expansion targets. An important characteristic of the energy commodity trade is the long and variable leadtimes in the development of projects. This presents major problems for suppliers because of the uncertainty involved in making investment decisions today that will not start to bring an economic return for a considerable amount of time. The costs of wrong or mis-informed investment decisions can be very high given the high capital intensity of mining projects and degree of bilateral monopoly in the energy trade.

Capacity expansion targets in consumer countries, such as Japan, have consistently been revised downward particularly since the 1973 oil crisis. Those revisions have caused major problems for supplier countries, such as Australia, which face declining profitability and uncertainty about future investments. In some instances, supplier countries have argued that consumer countries have intentionally over-estimated capacity targets in order to create an over-supply situation so that they can improve their bargaining positions in bilateral negotiations. Among other things, this proposition presumes that planners in countries reliant on traded energy goods have perfect information and are, therefore, capable of assessing accurately capacity expansion targets and the determinants that will influence the attainability of those targets.

There are methods of evaluating project leadtimes in countries such as Japan. Supplier countries need not rely solely on capacity forecasts published by authorities in consumer countries. It is possible for them to evaluate particular projects in which they have an interest and monitor the development of those projects. The cost of providing independent evaluation of project start-up times is likely to be less than costs which might be associated with simply relying on published capacity targets. Complaining about the intentions of consumer countries when capacity targets have not been met is not appropriate when these alternatives to monitoring demand forecasts are available.

APPENDIX

APPENDIX 1

ABBREVIATED ENGLISH TRANSLATION OF

LEADTIME QUESTIONNAIRE

Name of Company	Prefecture	Plant Number	Fuel	Capacity
Name of Power Plant	City, Town or Village			

Stage	Item	Date
Commencement of Siting Process	1.0 Internal company decision 1.1 Declaration of Intent 1.2 Appearance in company plans 1.3 Invitation by regional government 1.4 Company application	
Public Acceptance	2.0 Commencement and completion of Environmental Assessment 2.1 Land acquisition agreement 2.2 Fishing right transfer agreement 2.3 Prefectural government approval 2.4 Denchōshin approval	
Licensing	4.0 Nuclear Reactor Permit (only in the case of nuclear power plants) 4.1 Electricity Facility Expansion Permit 4.2 Construction Planning Permit 4.3 Others licenses and permits . Agricultural Land Transfer Permit . Forest Preservation Permit	
Construction	5.0 Reclamation 5.1 Preliminary Construction 5.2 Excavation 5.3 Trial Operations 5.4 Commercial Operation } Commencement and Completion	

APPENDIX 2

RESIDUALS OF STATISTICAL MODELS

Site Name	Fuel[a]	Package[b]	Actual PAT[c]	Predictive Model		Evaluative Model	
				Predicted	Residual	Evaluated	Residual
Date	T	1	33	20	13	29	4
Shiruchi	T	1	36	43	-7	33	3
Kyowa-Tomari	N	1	156	110	46	131	25
Onagawa	N	1	140	94	46	106	34
Maki	N	1	118	97	21	132	-14
Higashi-Niigata	T	1	14	17	-3	22	-8
Tokai	N	1	4	7	-3	-3	1
Tsuruga	N	2	19	8	11	19	0
Fukui-T	T	1	5	16	-11	9	-4
Fukushima-2	N	1	80	43	37	46	40
Hirono-2	T	1	10	21	-11	12	-2
Hirono-2	T	2	32	31	1	-	-
Kashiwazaki-Kariwa	N	1	73	88	-15	66	7
Minami-Yokohama	T	1	15	25	-10	21	-8
Minami-Yokohama	T	2	3	3	0	14	-11
Sodegaura	T	1	25	18	7	27	-2
Kashima	T	1	36	10	16	12	4
Kashima	T	2	16	10	6	10	4
Kudamatusu	T	2	29	21	8	25	4
Shimonoseki	T	2	34	19	15	22	12

APPENDIX 2 (Cont.)

RESIDUALS OF STATISTICAL MODELS

Site Name	Fuel	Package	Actual PAT	Predictive Model: Predicted	Predictive Model: Residual	Evaluative Model: Evaluated	Evaluative Model: Residual
Shimane	N	1	32	54	-22	22	10
Shimane	N	2	40	28	12	35	5
Ooasemita	T	1	11	24	-13	12	-1
Chita-4	T	2	28	34	-6	23	5
Taketomi	T	2	18	23	-5	10	2
Nishi-Nagoya	T	1	18	32	-14	21	-3
Nishi-Nagoya	T	2	18	29	-9	13	5
Atsumi	T	2	104	23	81	30	74
Hamaoka	N	1	23	24	-1	15	8
Hamaoka	N	2	26	14	12	36	-10
Oi	N	1	21	22	-1	23	-2
Takahama	T	1	31	36	-5	20	11
Takahama	T	2	22	13	9	30	-8
Mihama	N	2	2	15	-13	3	-1
Aioi	T	1	80	27	53	105	-25
Amagasaki-3	N	2	23	22	1	22	1
Gobo	T	1	117	18	99	46	71
Saijo	T	1	5	10	-5	10	-5
Ikata	N	1	37	28	9	83	-46
Sendai-N	N	1	73	60	13	66	17

APPENDIX 2 (cont.)

RESIDUALS OF STATISTICAL MODELS

Site Name	Fuel	Package	Actual PAT	Predictive Model		Evaluative Model	
				Predicted	Residual	Evaluated	Residual
Oita	T	2	10	6	4	8	2
Ainoura	T	1	4	12	-8	6	-2
Sendai-T	T	1	17	11	6	23	-5
Genkai	N	1	37	41	-4	83	-46
Shinkokura	T	1	22	39	-17	15	7
Shinkokura	T	2	37	28	9	-	-
Buzen	T	1	63	37	26	29	34
Karatsu	T	2	25	8	-17	8	13
Matsushima	T	1	44	68	24	68	-24

Notes: a. T: Fossil-fuelled; N: Nuclear
b. 1: Initial package; 2: Subsequent package
c. Measured in months.

APPENDIX 3

CHRONOLOGY OF EVENTS

SITING ASHIHAMA NUCLEAR POWER PLANT

NOVEMBER 1963 TO SEPTEMBER 1967

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1963 November							
15	Conveys siting proposal to prefecture						
17			Governor Tanaka orders Prefectural officials to consider proposal				
20			Investigates Kisei town, Nanto town, Nagashima city, and Kaiyama city				
28			Governor requests co-operation from four mayors				
December							
1	Newspaper article on proposed nuclear siting in Kumano Region						
3	Request boring permit						
5, 6		Four mayors visit Tokai-mura nuclear plant					
7	Meets with governor; governor decides that towns will consider proposal within two weeks						
9		Nanto town officials receive explanation from utility and prefecture					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
11		Kisei town officials receive explanation from utility and prefecture			Opposition by fishing co-operatives prevents Kaiyama town from issuing investigation permit		
13	Obtains permission for investigation permit at Ashihama						
Middle December						Japan Communist Party (JCP) holds anti-siting parade in region	
17			Governor states that prefecture wishes to promote project		Mie Prefecture Fishing Co-operative discusses proposal with seven fishing co-operatives from Nanto town		
19-26					Mie Prefectural Fishing Co-operative visits Tokai-mura nuclear plant		
February 5					Kowaura Fishing Co-operative sends petition to Nanto town opposing proposal		
16						JCP and Japan Socialist Party (JSP) demonstrates in Kaiyama city	

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
17		Nanto town establishes Genshiryoku hatsudenshō tokubetsu iinkai [Special Committee for Promoting Nuclear Energy; hereafter Special Committee]					
23					Kowaura Fishing Co-operative decides to oppose nuclear plant		
March 7-9					Kowaura Fishing Co-operative establishes Genpatsu hantai kyōtō iinkai [Fisherman's Struggle Committee for Opposing Nuclear Plant] and request co-operation from other fishing co-operatives in Nanto town		
16					Fishing co-operatives from Nanto town and Fisherman's Council establish Genpatsu hantai gyogyōsha kyōtō chuō iinkai [Central Fishing Struggle Committee for Opposing Nuclear Energy; hereafter Central Committee] and establishes headquarters in Mie Prefectural		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
April 16					Central Committee collects 16,360 signatures and sends petition to prefectural government		
May 20 to June 2					Hold demonstrations and decides not to participate in meeting sponsored by prefecture and utility		
17		Nanto town opposes nuclear project			Kowaura Fishing Co-operative opposes nuclear proposal		
July 10					Approximately 600 fishermen encircle governor as he leaves prefectural office		
18-19		Nanto town Mayor promotes proposal although town assembly opposes					
21					Central Committee starts recall movement to oust Mayor of Nanto town		
24					Sea parade by Central Committee		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
27	Decides on Ashihama	Kisei town assembly agrees on proposal			Central Committee decides to oppose by force		
30		Mayor of Nanto town resigns					
August 5			Decides on regional development plan in Kisei and Nanto towns				
13					Nanto Fishing Co-operatives sends petition to governor		
24		Non-contested election in Nanto town Nomura Junnosuke ousted; Yamamato Tenzo elected					
December 28	Publishes design plan of proposed nuclear plant						
1965 January 8			Prefectural branch of Liberal Democratic Party (LDP) establishes Genshiryoku heiwa riyō kenkyūkai [Research group on the Peaceful Uses of Nuclear Energy; hereafter Research Group]				

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
23			Research Group holds meeting on nuclear energy, Nanto Fishing Co-operative is invited but does not attend				
March 1			Discusses budget proposed for nuclear energy investigation; Kisei town supports proposal but Nanto town opposes				
6			States that it will conduct independent ocean investigation				
20			Budget for investigating industrial development passed by assembly		Central committee sends peitition from 144 fishing co-operatives to prefecture		
28			Nanto Fishing Co-oeprative discusses future strategy				
May 30					3000 fishermen from Nanto town decide to oppose by force		
July 23	States that wants to reach agreement within next couple of months						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
August 2			Deputy Governor visits the region and is surrounded by Fishing Co-operative surveillance boats				
November 15			Prefecture publishes plan for 63,000 million yen in subsidy for regional development to Nanto, Kisei and Kaiyama				
20			Nanto town decides on budget allocation for opposing nuclear power plant				
24	Completes land acquisition						
December 14		Nanto town collects 8,023 signatures and sends petition to prefectural government					
22			Decides to take a low posture				
1966 January 13					Decides on a policy of patrolling ocean regularly		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
March 9			Allegation that Kisei LDP is receiving money from utility				
17					Ocean parade at Ashihama		
19			Nuclear energy investigation budget passed in assembly				
22	States that will commence investigations next month						
28			Persuades utility to wait before starting investigations				
29					Increase patrolling and sends petition to National Diet and utility		
June 15			States that utility can conduct independent investigation				
July 7			Assemblymen request that utility abandon proposal because of strong opposition by Nanto town				

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
14	Requests co-operation from Nanto Fishing Co-operative to conduct investigation						
28					Increases patrolling operations and commences training exercises to oppose by force		
29	Starts preparations for investigations				States that will oppose by force		
August 8	Executes preliminary investigation						
15	States that will complete construction in October 1970						
25	Conveys intention to Prefecture about starting full scale investigations next month				Sasaki Fishing Co-operative says that it will allow investigation if Nanto fishing co-operatives give permission		
September 19		Nagashima Incident					
October 19					Thirty fishermen arrested		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
November 15		Kisei town signs agreement with utility on investigation					
28	Starts investigation for constructing road						
29					Holds ocean demonstration; 1,300 boats participate		
1967 January 24		Eight assembly members from Kashinozaki town resign from Kisei assembly					
March 26		Recall movement commences in Kisei town					
April 5		Mayor Yoshida Tamenari resigns					
28		Sakaguchi Yuzo is elected in Kisei town election					
July 5	Newspaper article states that utility will site nuclear plant in Hamaoka town in Shizouka prefecture						
August 2			Governor says				

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
September 26			Governor states that prefecture will abandon nuclear power plant proposal				

APPENDIX 4

CHRONOLOGY OF EVENTS

SITING HAMAOKA NUCLEAR POWER PLANT

JANUARY 1967 to MAY 1969

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1967 January	Conveys siting proposal to local heads in Hamaoka town						
March		Mayor Shinozaki ousted in local election. Mayor Kawarazaki is elected.					
May 31	Conveys siting plan to Mayor Kawarazaki						
June 13		Town officials visit Tokai-mura nuclear plant					
28		Establishes <u>Hamaoka chō kaihatsu chōsa iinkai</u> [Hamaoka Development Investigation Committee]					
July 5		Scoop on proposed nuclear siting at Hamaoka in Sankei newpaper.					
7-9		Fifty local residents visit Tokai-mura nuclear plant					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
12-18					Five Hainan Fishing Co-operatives visit Ashihama	<u>Kenpyō</u> [Prefectural Council of Trade Unions] establishes anti-nuclear movement.	
24					Agree to oppose nuclear plant construction		
25	Explains boring procedures to Hamaoka town				Establishes <u>Hamaoka chō genpatsu setchi hantai kyōgikai</u> [Hamaoka Anti-Nuclear Fishing Alliance; here-after Fishing Alliance]		
30	Selects boring site						
August 4	Starts prelimin-ary boring						
11					1100 fishermen demonstrate at Sagara town		
15						Shizouka Prefectural Branch of Japan Socialist Party (JSP) declares opposition	
24		Establishes <u>Hamaoka chō genshiryoku chōsa iinkai</u> [Hamaoka Nuclear Investigation Committee]	States that will co-operate providing Hamaoka town agrees to siting proposal				

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
28		Hamaoka continues preparations for agreement on siting					
September 1-4						Kenpyō and JSP organise	
7-8					Ten members of Fishing Alliance visit Tokai-mura Nuclear Plant		
9						Establishes Hamaoka genpatsu hantai shizouka ken kaigi [Shizuoka Prefectural Council for Opposing the Hamaoka Nuclear Power Plant]	
15						Establishes Hamaoka genpatsu kenkyū yushikai [Hamaoka Nuclear Research Supporters Group; hereafter Supporters Group]	
17						Holds first Dai yonsha kaigai [Group of Four meeting] Participants: JSP, Kenpyō, Chikurō [Regional Council of Trade Unions], and Kinrōkyo [Metal Workers Union]	

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
September 18		Hamaoka town sponsors lecture series on nuclear energy					
19	Explains siting proposal to landowners						
20						Establishes <u>Hamaoka genpatsu kenkyūkai</u> [Hamaoka Nuclear Research Committee; hereafter Research Committee]	
23	Utility, town and landowners decide to proceed with land negotiations			Agree to land negotiations			
24						Holds public lecture on safety and regional development	
28		Invites utility to site power plant and requests co-operation from Prefecture					
29	Sends formal siting application to Hamaoka						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
<u>October</u> 3	Starts informal discussions with landowners				Establishes <u>Genpatsu hantai kyōtō kaigi</u> [Anti-Nuclear Struggle Committee; hereafter Struggle Committee] Participants: Fishing Alliance Supporters Group, Research Committee, and Group of Four		
23					Struggle Committee erects billboards and distribute anti-nuclear pamphlets		
<u>November</u> 14					Struggle Committee collects signatures from local residents		
16	Starts considering price structure for land aquisition						
23			Establishes <u>Hamaoka genpatsu taisaku shingikai</u> [Hamaoka Nuclear Policy Deliberation Committee; hereafter Deliberation Committee]				
29					Struggle Committee distributes pamphlets		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
December 5	Explains plant design to Fishing Alliance						
13			Attempts to persuade Fishing Alliance to permit siting				
18					Fishing Alliance holds meeting with Prefectural Governor		
24					Struggle Committee conducts car parade		
27			Liberal Democratic Party establishes Genpatsu tokubetsu iinkai [Special Nuclear Energy Committee]				
1968 January 16		Meeting between Mayor's of Hamaoka, Omaezaki, and Sagara towns					
20		Establishes Genpatsu taisaku shingikai [Omaezaki and Sagara Nuclear Committee]					
26					Struggle Committee meets on land transfer question		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1968 February 5	Makes first offer on land prices to landowners						
6				Refuse first offer			
11		Establishes Sakura taisaku kyōgikai [Sakura Hamlet Policy Committee; hereafter Sakura Committee]					
March 10	Makes second offer on land prices to landowners			Refuse second offer			
20					Conduct boat demonstration at Hamaoka	Conducts demonstration at Hamaoka	
27					Establishes Genpatsu kenkyū shingikai rijikai [Board of Directors Nuclear Study Deliberation Committee; hereafter Directors Committee] within Fishing Alliance		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1968 April 6					Fishing Alliance hold Public meeting at Sagara town		
27				Select formal representative for land negotiations	Directors Committee discusses ocean investigations with prefecture		
May 6				Establishes Yōchi Kōshō iinkai [Land Negotiating Committee]			
16			Director of Fishing Bureau visits Sagara town				
18				Make broad agreement on land transfer prices and compensation			
27					Directors Committee discusses results of ocean investigations		
June 5					Directors Committee publishes memorandum on ocean investigations		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1968							
June							
6			Fishing Bureau starts independent ocean investigations				
29					Struggle Committee considers future strategy		
July							
15					Struggle Committee demonstrates to oppose land transfer		
20					Struggle Committee demonstrates to strengthen movement		
August							
5	Utility Prefectural Governor, and Hamaoka Mayor meet at Prefectural Office						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1968 August 9	Utility and Hamaoka conclude agreement of nuclear plant siting						
13				Sign preliminary contract on land transfer			
14	Utility, Prefectural Governor and Hamaoka Mayor agree on fund-amental conditions for land transfer						
15					Leadership change in Fishing Alliance Hata Tōju ousted; Onoda Shōsaku elected		
31		Hamaoka town completes construction of Cultural Centre					
September 10			Prefectural Fishing Bureau publisizes results of ocean investigation				

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1968 September 17		Hamaoka discusses regional co-operation compensation with utility					
26		Hamaoka discusses regional co-operation compensation with Prefecture					
October 9				Complete the major part of land transfer negotiations			
12		Refuses use of public hall to anti-siting movement					
15					Establishes *Genpatsu kankei gyōkyō gōdō kaigi* [United Fishermans Council on Nuclear Siting; hereafter United Council]		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1968 October 18					United Council meets with utility		
30				Remaining land transfer agreement completed			
December 12	Starts pile driving and preliminary site preparation						
1969 January 7		Omaezaki and Sagara Nuclear Committee visit Kansai Electric Power Company's nuclear plants in Fukui Prefecture			United Council visits Fukui Prefecture		
9			Takes twenty members of Fishing Alliance to visit Fukui Prefecture				
17	Starts actual pile driving						
20	Starts investigations for site preparation						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
February 23						Demonstrates at Hamaoka	
March 8	Applies to Economic planning Agency for Denchōshin Permit						
31					United Council starts fishing negotiations with utility		
April 4		Sakura Committee discusses regional co-operation compensation with utility					
14					Fishing Alliance expresses strong opposition to nuclear siting		
16					Fishing Alliance meets; concludes no further discussion with utility necessary		
24		Omaezaki and Sagara Nuclear Committee discuss opposition by Fishing Alliance			Fishing Alliance reiterate opposition		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1969 <u>May</u> 15					Struggle Committee opposes application for Denchōshin Permit		
16					Struggle Committee goes to Tokyo; opposes application for Denchōshin Permit		
23							Conditional Denchōshin Permit issued
<u>June</u> 13					Fishing Alliance conveys opposition to utility for ignoring fishing interests by applying for Denchōshin Permit		
19	Sends memorandum to Fishing Alliance						
<u>July</u> 1		Establishes <u>Hamaoka genpatsu mondai kyūmei iinkai</u> [Hamaoka Nuclear Energy Fishing Investigation Committee; hereafter Fishing Committee]					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1969 July 28					Fishing Committee commences investigation		
December 1		Fishing Committee completes investigation and submits to five Hainan Fishing Co-operatives					
1970 January 21					Establishes Fishing Rights Negotiation Committee		
March 3							Formal Denchōshin Permit issued
May 29					Complete compensation negotiations		

APPENDIX 5

CHRONOLOGY OF EVENTS

SITING MATSUSHIMA COAL-FIRED PLANT

FEBRUARY 1973 to DECEMBER 1976

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	NATIONAL GOVERNMENT	LICENSING
1973 February						MITI announces Fifth Coal Policy	
		Nagasaki ken tankyō shichōsen rengō kai [Nagasaki Regional Liason Committee for the Coal Industry] appeals to prefecture to develop coal-fired project					
March			Assembly agrees on development of Matsushima project				
April	Electric power development company (EPDC) commences internal evaluation of Matsushima site						
June			Sends petition to Ministry of Finance (MOF)				
5						MITI states that wishes to develop coal-fired projects in accordance with Fifth Coal Policy	
October	Middle East War erupts; Oil crisis.						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	NATIONAL GOVERNMENT	LICENSING
1974							
January 6	EPDC publishes Five Year Plan: stresses importance of developing coal-fired station						
February 15						MITI announces policy of importing steaming coal	
March 13	EPDC states that will build three thermal plants						
April 6	EPDC starts negotiations with prefecture and Ooseto town over Environmental Assessment						
May 17	Kyushu Electric Power Company expresses negative attitude towards project						
31	EPDC announces that will establish office in Ooseto town						
18	President of Kyushu Electric expressed negative attitude at press conference in Tokyo						
31	EPDC states that will commence Environmental Assessment in Agugust						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	NATIONAL GOVERNMENT	LICENSING
August 8					Matsushima Fishing Co-operative agrees on Environmental Assessment		
	EPDC starts Environmental Assessment						
September 14						*Nishi chiiki denryoko kyōgi kai* [Western Electricity Sphere Deliberative Council; hereafter Electricity Council] discusses Matsushima project	
20						Electricity Council agrees on Matsushima project	
1975 January 11	EPDC announces Five Year Investment Plant						
February 1	EPDC starts siting investigation						
13	EPDC starts investigation for land and property transfer arrangements						
September 9	EPDC requests budget from MITI for compensating regional						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	NATIONAL GOVERNMENT	LICENSING
September				Establishes Seikatsu kyōgi kai [fife deliberative council]			
11			Nagasaki Governor agrees to project				
18						Electricity Council agrees formally to project	
October 18						MOF expresses negative attitude towards project	
27			Sends petition to MITI for budget allocation				
November 14		Ooseto Mayor appeals to MOF for budget allocation					
December 13						MITI asserts pressure on MOF to provide budget for project	
1976 January 7	EPDC announces Five Year Plan						
February 1		Town drafts first plan for distribution of community compensation from Three Laws					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	NATIONAL GOVERNMENT	LICENSING
February 1						MITI provides budget allocation to EPDC for community negotiations	
7	EPDC explains development plan to prefecture and Ooseto town						
13	EPDC explains results of Environmental Assessment and applies for construction permit to Ooseto; states that wishes to start land negotiations by April						
8	States that will co-operate in community negotiations						
9	EPDC states that wants to start construction in November						
April 11				Agree to individual negotiations over land transfer arrangements			
13	EPDC, Prefecture and town start to apply pressure on landowners who will not sell land; continues until January, 1977.						
June 27		Uchiura hamlet agrees conditionally on project					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	NATIONAL GOVERNMENT	LICENSING
July 28	EPDC makes offer on land transfer						
August		Yukiura, Ooseto, and Taira hamlets agree conditionally on project					
September Mid		Ooseto town assembly agrees on community compensation for fishing industry					
19					Four fishing co-operatives agree on project		
October 3					Matsushima Fishing Co-operative agrees to project		
November 2		Matsushima residents send Matsushima denpatsu kensetsu in taisuru matsushima chiiku jūmin no jōken, jōbō [Conditions and Demand of Matsushima Residents toward the EPDC's Matsushima Coal-fired Project; hereafter Conditions]					
21	EPDC responds to Conditions						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	NATIONAL GOVERNMENT	LICENSING
December 12		Town gives approval for Denchōshin permit					
October Mid.	EPDC makes offer to fishing co-operatives on property right transfer						
November 14					Ooseto Fishing Co-operative demands adequate payment for transfer of rights		
December 27						Denchōshin approval given	

APPENDIX 6

CHRONOLOGY OF EVENTS

SITING KYOWA-TOMARI NUCLEAR POWER PLANT

NOVEMBER 1968 to FEBRUARY 1982

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1969 October		Establishes Kyowa mura genshiryoku hatsudenshō kensetsu tokubetsu iinkai; [Special Committee in Kyowa village for the Construction of a Nuclear Power Plant					
December		Establishes Kyowa-tomari chiku genshiryoku hatsudenshō kensetsu kyōryoku kai [Co-operation Committee for the Promotion of the Kyowa-Tomari Nuclear Power Plant]					
1970 January 22-25		Chamber of Commerce sponsors lecture series on Nuclear Energy at Iwanai town					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1970 March 20					Iwanai Fishing Co-operative establishes Genpatsu sechi hantai taisaku iinkai; [Policy Committee for Opposing the Construction of a uclear Plant]		
May 15		Tomari village assembly agrees on nuclear plant construction					
25					Iwanai Fishing Co-operative declares opposition to plant		
28					Sakazuki Fishing Co-operative declares agreement on plant		
June 6					Kamoenai Fishing Co-operative declares opposition		
10					Iwanai Fishing Co-operative sends petition to Iwanai Town Assembly [11,033 signatures]		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1970 <u>June</u> 25					Four Ganu Fishing Co-operatives establish <u>Genpatsu setchi hantai gyōkyō rengō iinkai</u> [Fishing Co-operative Alliance Committee for Opposing the Construction of a Nuclear Plant; hereafter Ganu Fishing Alliance]		
<u>August</u> 11			Meets with five Ganu Fishing Co-operative and four Mayors and discusses siting proposal				
31		Kyowa village land transfer agreement is finalised					
<u>November</u> 15					Ganu Fishing Alliance sponsors lecture series on nuclear safety and ocean pollution		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1971 January 10	Establishes liason office in Iwanai town						
February 7 - 9	Explains nuclear safety and fishing compensation to five Ganu Fishing Co-operatives						
March 7						Establishes Gosha kyōtō [Five Member Struggle Alliance] Participants: Zendorokyō [All Prefectural Labour Union], Shakaitō dō Konbu [Hokkaido Branch of Japan Socialist Party], Shiribeshi rōkyō [Shiribeshi Labour Union], and Zenhokuden [Hokkaido Electric Power Company Union]; sponsors meeting at Iwanai town	
20					Tomari Fishing Co-operative decides on independent fishing investigation		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1971 June 20		Iwanai Chamber of Commerce visits nuclear plants in Honshu					
23					Sakazuki Fishing Co-operative members visit nuclear plants in Honshu; Ganu Fishing Alliance demonstrates	Chikurō [Regional Council of Trade Unions] demonstrates	
August 10					Tomari Fishing Co-operative starts ocean investigation at Tomakomai thermal power plant		
September 9					Iwanai Fishing Co-operative decides on resolution to oppose		
10					Tomari Fishing Co-operative decides to establish Genpatsu taisaku chōsa iinkai [Nuclear Policy Investigation Committee]		
October 25					Ganu Fishing Alliance sponsors lecture series at Iwanai town		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
November 24		Anti-nuclear members in Iwanai town assembly establish Iwanai genpatsu mondai giin kondan kai [Assemblymen Committee for Considering Nuclear Energy]					
1972 January 27		Iwanai town Chamber of Commerce and Iwanai genpatsu kensetsu sokushin kyō [Group for the Promotion of the Iwanai Nuclear Power Plant]; demands that siting decision awaits prefecture's ocean investigation					
31	Drafts statement on measures for regional development and sends it to four Mayors						
February 1		Twelve members of Iwanai town assembly establish Genpatsu to chiiki kaihatsu kenkyū giin kai [Assemblymen Group for Studying Nuclear Energy and Regional Development]					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
February 5		Iwanai chō sangyō jonin iinkai [Standing Committee for Iwanai Town Industry] sponsors public meeting on nuclear issues in Iwanai town					
26						Iwanai Regional Council of Trade Unions reaffirms opposition on nuclear plant siting	
April 20			Prefectural Government publisizes results of ocean investigations				
May 10			Prefectural Bureau Fisheries adopts cautious stance on siting in prefectural assembly				
17					Iwanai Fishing Unions sends petition to prefecture opposing nuclear energy		
June 24		Standing Committee for Iwanai town Industry adopts policy of opposition to siting					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
July 24		Iwanai Town Assembly adopts anti-nuclear resolution					
25			Prefectural governor adopts extremely cautious stance				
27 - 31		Tomari village Council members visit nuclear plants in Honshu					
August 21 - 28		Tomari village Council members visit nuclear plants in Honshu					
September 17 - 22					Sakazuki Fishing Co-operative visits Tsuruga and Mihama nuclear plants		
25					Tomari Fishing Union visits Tomakoma thermal power plant		
October 16 - 20		Alliance for the promotion of the Iwanai Nuclear Power Plant visits Tokai, Tsuruga and Mihama nuclear plants					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
February 5		Iwanai chō sangyō jonin iinkai [Standing Committee for Iwanai Town Industry] sponsors public meeting on nuclear issues in Iwanai town					
26						Iwanai Regional Council of Trade Unions reaffirms opposition on nuclear plant siting	
April 20			Prefectural Government publisizes results of ocean investigations				
May 10			Prefectural Bureau Fisheries adopts cautious stance on siting in prefectural assembly				
17					Iwanai Fishing Unions sends petition to prefecture opposing nuclear energy		
June 24		Standing Committee for Iwanai town Industry adopts policy of opposition to siting					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1973 February 20		Iwanai Mayor freezes memorandum with utility					
July 16		Iwanai Mayor discusses present situation with anti-siting groups					
September 16 - 21					Iwanai Fishing Co-operative visits nuclear plants on Honshu		
22 - 25					Tomari Fishing Co-operative visits nuclear plants on Honshu		
1974 October 11	Start negotiations with Tomari Fishing Co-operative						
1975 February 20	Establish nuclear energy section within utility						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
March 1		Tomari Village Assembly establishes Genpatsu taisaku tokubetsu iinkai [Special Committee on Nuclear Siting Policy]					
October 22			Sapporo Branch of MITI explains planned ocean investigation to Iwanai, Kyowa, Tomari and Kamoenai				
November 25			Agency of Natural Resources and Energy (ANRE) explains proposed ocean investigations to Fishing Co-operatives				
29			ANRE starts ocean investigations				
December 20	Starts first discussions with Iwanai Fishing Co-operative						
24		Iwanai town establishes Genshiryoku hatsudenshō mondai tokubetsu iinkai [Special Committee for Considering the Nuclear Siting Question]					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1976 March 12		Iwanai Mayor states that he will reexamine memorandum with utility if there is broad agreement					
June 16					Sakazuki Fishing Co-operative agrees on nuclear construction and establishes nego-tiating committee		
25		Tomari village approves the nuclear plant					
October 7	Reaches broad agreement with Tomari Fishing Co-operative of fishing development						
December 3		Iwanai town approves power plant conditionally					
24		Tomari village approves power plant conditionally					
1977 February 18		Iwanai Mayor declares intention to conclude new memorandum					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
March 10					Motion to change policy of absolute opposition at general meeting of Iwanai Fishing Co-operative: no vote taken		
16		Kamoenai Village Assembly approves nuclear plant conditionally					
July 6					Motion to change policy of absolute opposition defeated in Iwanai Fishing Co-operative general Meeting		
October 7		Iwanai town concludes new memorandum with utility; four Ganu Towns and Villages request co-operation from prefectural governor					
26						Regional Council of Trade Unions holds seminar in Iwanai town	
November 1		Tomari village signs memorandum with utility					

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
December 23		Kamoenai village concludes memorandum with utility					
1978 February 14		Kyowa town concludes memorandum with utility					
March 3					Motion to change policy to conditional agreement defeated in Iwanai Fishing Co-operative general meeting		
April 19						Regional Council of Trade Unions starts signature collection movement to not consume fish caught near Iwanai town	
September 1						Regional Council of Trade Unions collects 10,000 signatures; visits Iwanai town	
28 - 29			Prefecture explains environmental implic-ations of the nuclear plant to four Ganu Fishing Co-operatives				

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1979 February 6		Kyowa town Assembly approves site change					
21		Tomari village assembly approves site change					
March 10					Tomari Fishing Co-operative agrees to site change		
15					Sakazuki Fishing Co-operative agrees to site change		
16		Kamoenai village assembly approves site change					
April 2						Japan Communist Party (JCP) requests prefectural comment on Three Mile Island (TMI) accident	
6 - 7			Sapparo MITI explains TMI accident to four Ganu towns and villages				

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
May 7						JCP request utility to abandon siting plan	
18						Struggle Alliance requests utility to abandon siting plan	
August 29			Officials from ANRE visit Ganu region				
19 - 20			Hokkaido Prefecture and four Ganu towns and villages sponsor lectures on nuclear safety				
October 26		Kamoenai Fishing Union approves nuclear siting conditionally					
November 9	Starts land investigation						
December 13	Starts ocean investigation						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
1980 March 29 - April 2						Regional Council of Trade Unions and Struggle Alliance holds anniversary week for the TMI accident in Ganu region	
July 1	Establishes nuclear siting promotion section						
November 5					Tomari Fishing Co-operative approves port design		
1981 March 15	Explains compensation criteria to Tomari Fishing Co-operative negotiating committee				Kamoenai Fishing Co-operative approves siting conditionally		
April 24 - 25			Prefectural Fisheries Bureau explains environmental assessment to four Ganu Fishing Co-operatives				
June 10	Starts compensation negotiations with Tomari Fishing						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
June 18	Reaches broad agreement with Tomari Fishing Co-operative						
23	Starts compensation negotiations with Sakazuki Fishing Co-oeprative						
26	Reaches broad agreement with Sakazuki Fishing Co-oeprative on compensation						
August 14						Council for Trade Unions, JSP and Struggle Alliance send memorandum to Iwanai Fishing Co-operative stating that change of opposition policy will result in move-ment to stop purchasing fish distributed from Iwanai port	
September 28					Iwanai Fishing Co-operative approves plant conditionally		

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
October 9	Submits environmental assessment to MITI and Hokkaido Prefectural Government						
November 10						JCP opposes first public hearing	
17						JSP opposes first public hearing	
18						Struggle Alliance opposes first public hearing	
29						Establish Kyowa chō san nōkyō genpatsu hantai taisaku kyōgi kai [Kyowa town Agricultural Co-operative Group for Opposing Nuclear Energy; hereafter Kyowa Agricultural Group]	
December 4						JCP and Council of Trade Unions oppose first public hearing	

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
December 21					Tomari Fishing Co-operative approves regional fishing development agreement		
25					Sakazuki Fishing Co-operative approves regional fishing development agreement		
26	Formally signs agreement with Sakazuki Fishing Co-operative						
1982 January 13						Kyowa Agricultural Group files request with town assembly for agricultural development funds	
February 13						Kyowa Agricultural Group file request with utility MITI and Prefecture for agricultural development funds	
March 1	Submits revised environmental assessment for Kyowa-Tomari No. 1 and No. 2 Nuclear Power Plants to Prefecture						

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
March 6						Kyowa Agricultural Group commences recall movement	
8	Signs Agreement on fishing development with Kamoenai Fishing Co-operative						
11			Economic Planning Agency requests prefectural governor's opinion on nuclear plant				
13					Iwanai Fishing Co-operative requests that governor does not give opinion until fishing negotiations are completed with utility		
19	Agrees on memorandum concerning agriculture development funds with Kyowa town						
April 23			Prefectural Governor gives consent to No. 1 and No. 2 Kyowa-Tomari Nuclear Power Plants				
26							Denchōshin permit for Kyowa-Tomari No. 1 and No. 2 Nuclear Power

DATE	UTILITY	LOCAL GOVERNMENT	PREFECTURAL GOVERNMENT	LAND RIGHT OWNERS	FISHING RIGHT OWNERS	ANTI-SITING MOVEMENT	LICENSING
November 26	Signs agreement with Iwanai Fishing Co-operative on regional fishing development compensation						
December 13	Reaches broad agreement with landowners in Tomari village						

BIBLIOGRAPHY

Books, Journals and Official Publications

English Sources

Anderson D., Models for Determining Least Cost Investments in Electrical Supply', **Bell Journal of Economics and Management Sciences**, No.3, 1976.

Anton T.J., 'Power Pluralism and Local Politics', **Administrative Science Quarterly**, Vol.7, March 1963.

Bachrach P. and Baratz M.S., **Power and Poverty: Theory and Practice**, Oxford University Press, London, 1972.

Baccow L.C., 'Creating Markets for Development Externalities', **MIT Energy Laboratory Working Paper**, MIT-EL, 80-030WP, July 1980.

Baccow L.C. and Sanderson D.R., 'Facility Siting and Compensation: A Handbook for Communities and Developers', **MIT Energy Laboratory Working Paper**, MIT-EL, 80-037WP, September 1980.

Banfield E.C., **Political Influence**, Free Press, New York, 1966.

Baumol W. and Oates W., **The Theory of Environmental Policy: Externalities, Public Outlays and Environmental Policy**, Prentice-Hall, New Jersey, 1975.

Coarse R.H., 'The Problem of Social Cost', **The Journal of Law and Economics**, Vol.3, October 1960.

Dahl R.A., 'The Concept of Power', **Behavioural Science**, Vol.2, July 1957.

'The Analysis of Influence in Local Communities' in Adrian C.R., ed., **Social Science and Community Action**, East Lanzig, Michigan, 1960.

Dasgupta A.K. and Pearce D.W., **Cost-Benefit Analysis**, MacMillan, London, 1978.

Draper N.R. and Smith H., **Applied Regression Analysis**, John Wiley and Sons Inc., New York, 1966.

Freeman A.M., 'The Distribution of Environmental Quality' in Kneese A. and Bower B., eds., **Environmental Quality Analysis: Theory and Method in the Social Sciences**, John Hopkins Press, Baltimore, 1972.

Groennings S., Kelley E.W. and Zeiserson M., eds., **The Study of Coalition Behaviour: Theoretical Perspectives and Cases from Four Continents**, Holt, Rinehart and Winston Inc., New York, 1970.

Hamilton M.S., 'Power Plant Siting: A Literature Review', **Natural Resources Journal**, Vol.19, January 1979.

Hettich W., 'Distribution in Cost-Benefit Analysis: A Review ofTheoretical Issues', **Public Finance Quarterly**, Vol.4, December 1969.

Hinkley B., ed., **Coalitions and Time: Cross Disciplinary Studies**, Sage Publications, London, 1976.

Jopling R.G., et al., 'Forecasting Public Resistance to Technology: The Example of Nuclear Power Reactor Siting' in Bright J.R. and Schoeman M.E.F., **A Guide to Practical Technology Forecasting**, Prentice-Hall, New Jersey, 1973.

'Plant Site Evaluation Using Numerical Ratings', **Power Engineering**, March 1974.

Kane E.J., **Economic Statistics and Econometrics: An Introduction to Quantitative Economics**, A Harper International Edition, New York, 1969.

Kelley E.W., 'Techniques for Studying Coalition Formation', **Midwest Journal of Political Science**, Vol.12, January 1968.

Layard R., **Cost-Benefit Analysis: Selected Readings**, Penguin Education, Harmondsworth, 1976.

Lesbirel S.H., **Factors Influencing Long Term Uranium Demand in Japan with Special Reference to Nuclear Siting**, unpublished Honours Thesis, Griffith University, Brisbane, 1980.

Lester R.K., 'Nuclear Power Plant Leadtimes' in Smart I., ed., **World Nuclear Energy - Toward a Bargain of Confidence**, The John Hopkins University Press, Baltimore, 1983.

Lipsky M., 'Protest as a Political Resource', **American Political Science Review**, Vol.67, December 1968.

Little I.M.D. and Mirrless J.A., **Project Appraisal and Planning for Developing Countries**, Basic Books, New York, 1974.

Lowrance W., **Of Acceptable Risk: Science and the Determination of Safety**, William Kaufmann Inc., Los Altos, 1970.

Mac Guire C.B. and Garn H.A., 'The Integration of Equity and Efficiency Criteria in Public Project Selection', **The Economic Journal**, Vol.43, December 1969.

Meleis M. and Erdman R.C., 'The Development of Reactor Siting Criteria Based on Risk Probability', **Nuclear Safety**, Vol.13, January 1972.

Merelman R.M., 'On the Neo-Elitist Critique of Community Power', **American Political Science Review**, Vol.62, June 1968.

Mishan E.J., **Cost-Benefit Analysis: An Informal Introduction**, Allan and Unwin, London, 1972.

Musgrave R.A., 'Cost-Benefit Analysis and the Theory of Public Expenditure', **Journal of Economic Literature**, Vol.7, September 1969.

Nash C., Pearce D. and Stanley J., 'An Evaluation of Cost-Benefit Analysis', **The Scottish Journal of Political Economy**, Vol.22, June 1975.

Neff T.C. and Jacoby H.B., 'The International Uranium Market', **MIT Energy Laboratory Report**, MIT-EL, 80-014, Massachusetts Institute of Technology, December 1980.

Nelkin D., 'Technical Expertise as a Political Resource: A Power Plant Siting Controversy', **The Bulletin of Atomic Scientists**, September 1974.

-----, 'The Political Impact of Technical Expertise', **Social Studies of Science**, Vol.5, February 1975.

-----, 'The Politics of Participation and the Nuclear Debate: A Comparative Study', **Public Policy**, Vol.25, Fall 1975.

Nil N.H., et.al., **Statistical Package for the Social Sciences**, second edition, McGraw Hill Inc., New York, 1980.

OECD, **The Siting of Nuclear Facilities - Proceedings of a Symposium**, 9-12 December 1974, IAEA., Vienna, 1975.

O'Hare M., 'Not On My Block You Don't.... Facility Siting and the Strategic Importance of Compensation', **Public Policy**, Vol.25, Fall 1977.

Pearce D.W., and Sturmey S.G., 'Private and Social Costs and Benefits: A Note on Terminology', **Economic Journal**, Vol.76, March 1966.

Pearce R.W., **Cost-Benefit Analysis**, MacMillan, London 1971.

Polsby N.W., 'How to Study Community Power: The Pluralist Alternative', **Journal of Politics**, Vol.22, August 1960.

-----, **Community Power and Political Theory**, second edition, Yale University Press, New Haven, 1980.

-----, 'Three Problems in the Analysis of Community Power', **American Sociological Review**, Vol.24, December 1959.

Pressman J. and Wildavsky A., **Implementation: How Great Expectations in Washington are Reached in Oakland or Why It's Amazing that Federal Programs Work at All**, University of California Press, Berkeley, 1973.

Priest A. and Turvey R., 'Cost-Benefit Analysis: A Survey', **Quarterly Journal of Economics**, December 1965, reprinted in **Surveys of Economic Theory**, Vol.3, MacMillan, London, 1966.

Ricker W.H., **The Theory of Political Coalition**, Yale University Press, New Haven, 1962.

Rossi D., 'Community Decision Making' in Young R., ed., **Approaches to the Study of Politics**, Evanston, Illinois, 1958.

Salem S.C., et.al., **Issues and Problems in Inferring a Level of Acceptable Risk**, R-2561-DOE, Rand, Santa Monica, August 1980.

Sato H., **The Politics of Technology Importation in Japan: The Case of Atomic Power Reactors**, Paper delivered to SSRC Workshop at Kona, Hawaii, September 1978.

Schattschneider E.E., **The Semi-Sovereign People**, Holt, Rinehart and Winston, New York, 1960.

Schulze R.O., 'The Role of Economic Dominants in Community Power Structure', **American Sociological Review**, Vol.23, February 1958.

Skolnik M.L., 'A Comment on Professor Musgaves Seperation of Distribution from Allocation', **The Journal of Economic Literature**, Vol.8, June 1970.

Smith B., 'Long-Term Contracts for the Supply of Raw Materials' in Crawford J.G. and Okita S., eds., **Australia-Japan and Western Pacific Economic Relations**, Australian Government Publishing Service, Canberra, 1976.

-----, 'Export Price Bargaining and Bilateral Monopoly in the Minerals Trade', **Economic Record**, March 1977.

-----, and Drysdale P.D., **Stabilisation and the Reduction of Uncertainty in Bilateral Minerals Trade**, Australia-Japan Research Centre, Paper No.65 Canberra, 1979.

-----, 'Bilateral Commercial Arrangements in the Energy Coal Trade' in Harris S. and Ikuta T., eds., **Australia, Japan and the Energy Coal Trade**, Australia-Japan Research Centre, Canberra, 1982.

Starr C., 'Social Benefit Versus Technological Risk', **Science**, Vol.165, September 1969.

Sugden R. and Williams A., **The Principles of Practical Cost-Benefit Analysis**, Oxford University Press, London, 1971.

Supply Demand Committee, **The Balance of Supply and Demand 1978-1990**, The Uranium Institute, London 1979.

Suttmeier R., 'The Japanese Nuclear Power Option: Technological Promise and Social Limitations' in Morse R., ed., **The Politics of Japan's Energy Strategy**, Berkeley, 1981.

Turvey R., 'On Divergences Between Social Costs and Private Costs', **Economica**, Vol.30, August 1963.

Turvey R., 'On Investment Choices in Electricity Generation', **Oxford Economic Papers**, November 1963.

Weisbrod B.A., 'Income Redistribution Effects and Benefit-Cost Analysis' in Chase S.B., ed., **Problems in Public Expenditure Analysis**, The Brookings Institution, Washington D.C., 1968.

Wolfinger R., 'Non-Decisions and the Study of Local Politics', **American Political Science Review**, Vol.65, December 1971.

Wonnacott R.J. and Wonnacott J.H., **Econometrics**, second edition, John Wiley and Sons, New York, 1979.

Japanese Sources

Amano H., **Dengen richi keikaku an sakusei shuhō no kaihatsu** [Developmentof a Planning Model for Power Plant Siting], Kenkyū hokoku: 577004, Denryoku chuo kenkyūjō, October 1977.

Asahi shinbun sha, **Asahi nenkan** [Asahi Yearbook], Asahi shinbun sha, various issues, 1950-1980.

Dengen kaihatsu kabushiki gaisha, **Matsushima denpatsu kensetsu** [The Construction of the Electric Power Development Company's Matsushima Coal-Fired Plant], Dengen kaihatsu kabushiki gaisha, 1976.

-----, **Matsushima denpatsu kensetsu ni taisuru matsushima chiiku jūmin no jōken, yōbō** [Community Demands and Conditions Regarding the Matsushima Coal-Fired Plant], Dengen kaihatsu kabushiki gaisha, Tokyo, 1976.

-----, **Matsushima karyoku hatsuden shō chōsa to kensetsu keikaku no aramashi** [A Summary of the Investigation and Construction Plans for the Matsushima Coal-Fired Plant], Dengen kaihatsu kabushiki gaisha, year unknown.

Denki jigyō rengō kai, **Karyoku hatsuden shō setsubi gaiyō** [An Outline of Fossil-Fuelled Facilities in Japan], Denki jigyō rengō kai, Tokyo, 1982.

Hamaoka chō yakuba, **Hamaoka: shizuoka ken hamaoka chō chōsei yōran** [Hamaoka Town: A Survey], Hamaoka chō yakuba, Hamaoka, 1982.

Hamaoka genshiryoku hatsuden shō kensetsu hantai gyōmin kyōgi kai, **Hamaoka genpatsu ni taisuru gyōmin no toitsu kenkai** [A Unified Fishermen's View of the Mahaoka Nuclear Power Plant], Sagara, 1968.

Haraguchi I., **Gyōgyō to genpatsu** [The Fishing Industry and Nuclear Power], Kumano genpatsu chōsa kenkyū kai, Mie, 1973.

Hokkaido shōko kankyō bu, **Hokkaido enerugii gaiyō** [Energy in Hokkaido], Hokkaido shoko kankyo bu, 1983.

Homma U., 'Machi ni waka tachi ga kaette kita' [The Youth Have Returned], **Enerugii Fuōramu** [Energy Forum], February 1981.

Igarashi T., **Kojima ni dekita hatsuden shō: denpatsu matsushima sekitan karyoku** [The Power Plant that was Constructed on a Small Island: The Matsushima Coal-Fired Plant], Nikkei jigyō, Tokyo, 1982.

Ikuta T., 'Japan's Energy Policies', **Enerugii keizai** [Energy Economics], Vol.9, October 1984.

Inaba Y., **Paburikku akuseputansu** [Public Acceptance], Nihon denki kyōkai shinbun bu, Tokyo, 1977.

Ishibara N., ed., **Shichōson no tame no sōgō zaisei shindan no shichō** [A Diagnosis of Financial Measures for Regional Electorates], Daichi hōki, Tokyo, 1979.

Ishikawa S., **Sekitan senkō karyoku hatsuden shō no kensetsu ni taisuru yōbō shō** [Community Demands Regarding the Development of the Matsushima Fossil-Fuelled Plant], Nagasaki ken tangyō shichōson rengōkai, Nagasaki, April 1973.

Jichi shō zaisei kyoku shidō ka, **Shichōson betsu kessan jōkyō shirabe** [An Examination of Local Financial Accounts], Jichi shō zaisei kyoku shidō ka, various issues, 1963-1981.

Jichi shō zaisei kyoku shidō ka, **Todōfuken zaisei shisū hyō** [Prefectural Financial Indicators], Jichi shō zasei kyoku shidō ka, various issues, 1963-1981.

Kamata S., **Nihon no genpatsu chitai** [Nuclear Regions in Japan], Ikedeppansha, Tokyo, 1982.

Kamogawa T., **Sakura chiiku kaihatsu ni kansuru kibō ketsugi** [Resolution of Demands Regarding Development of Sakura Hamlet], Sakura chiiku taisaku kyogi kai, Hamaoka, 1968.

Kawaguchi T., **Hamaoka genshiryoku hatsuden shō kensetsu keikaku ni kakawaru gyōgyō e no eikyō kaimei no tame no kaiyō chōsa hōkoku** [A Report on the Impact of the Hamaoka Nuclear Power Plant on the Local Fishing Industry], Hamaoka genpatsu kyūmei iinkai, Omaezaki, 1969.

Kobayashi T., ed., **Kokyo yōchi no shūtoku ni tomonau sonshitsu hoshō kijun yōkō no kaisetsu** [Compensation Standards Accompanying the Acquisition of Public Lands], Kindai tosho kabushiki gaisha, Tokyo, 1983.

Kōgai taisaku shizuoka ken renraku kaigi, **Kōgai to shizuoka kenmin** [Pollution and the Shizuoka Community], No.6, Kō gai taisaku shizuoka ken renraku kaigi, Shizuoka, 1980.

Kubo S., **Sekitan senkō karyoku hatsuden shō kensetsu ni kansuru yōbō shō** [Demands Regarding the Construction of the Matsushima Coal-Fired Project], Nagasaki, December 1973.

-----, **Yōbō shō: Sekitan senkō karyoku hatsuden shō no kensetsu** [The Construction of the Matsushima Fossil-Fuelled Plant: Community Demands], Nagasaki, June 1973.

Matsushima richi jimushō, **Matsushima karyoku hatsuden shō kensetsu keikaku keii to genjō** [The Construction of the Matsushima Power Plant: Details and the Present Situation], Dengen kaihatsu kabushiki gaisha, Tokyo, 1977.

Mori S., **Genpatsu no machi kara: Tōkai dai jishintai jō no hamaoka genpatsu** [From a Nuclear Town: The Hamaoka Nuclear Power Plant Located on the Tokai Fault], Hatada shoten, Tokyo, 1982.

Nagashu shinbun sha, **Jinmin shōri no kiroku** [Records of the People's Victory], Nagashu shinbun sha, Shimonoseki, 1978.

Nagata F., ed., **Hōkoku: ooseto** [Ooseto Town: A Report], Ooseto chō yakuba kikaku ka, Ooseto, No.91, January 1976.

Nakamura K., et al., **Genpatsu: kumano gyōmin kaisenki** [Nuclear Power: The Sea Battle at Kumano], Gijutsu to ningen, Tokyo, 1980.

Nihon enerugii keizai kenkyujō, **Chiiki betsu enerugii juyō tokusei no bunseki** [Characteristics of Energy Supply and Demand in Japan by Prefecture], Nihon enerugii keizai kenkyujō, Tokyo, 1980.

Nihon genshiryoku sangyō kaigi, **Chiiki gyōsei mondai nado kenkyū kai oyobi dobanka kai hōkoku shō (Sankō shiryō)** [A Report on Regional Administrative Problems Relating to the Development of Power Plants], Tokyo, 1980.

-----, **Genshiryoku hatsuden sho-ranhyō** [Japan's Nuclear Power Plants], Nihon genshiryoku sangyō kaigi, Tokyo, 1978.

-----, **Genshiryoku kaihatsu 10-nenshi** [A Ten Year History of Nuclear Power in Japan], Vols. 1 and 2, Nihon genshiryoku sangyō kaigi, Tokyo, 1965.

Nihon maaketeingu kyōiku sentā, **Kojin shōtoku shihyō** [Income Indices in Japan], Nihon maaketeingu kyōiku sentaa, various issues, 1971-1981.

Nihon tōkei sentaa, **Enerugii shisetsu no richi o meguru funsō no kenkyū** [Research on Disputes over the Siting of Power Plants in Japan], Sōgō kenkyū kaihatsu kikō josei kenkyū: NRS-80-6, San Arima, Tokyo, 1981.

Omi K., eds., 'Matsushima sekitan karyoku hatsuden shō richi kaerimiru' [Reflecting on the Development of the Matsushima Coal-Fired Plant],**Denpatsu** [The EPDC Bulletin], Dengen kaihatsu kabushiki gaisha, January, 1978.

Seisaku kagaku kenkyujō, **Chiiki betsu enerugii kosuto no chiiki kaihatsu kōka ni kansuru chōsa** [Research on the Effects of Energy Costs on Regional Development by Prefecture], Seisaku kagaku kenkyujō, CR-80-30, Tokyo, 1981.

Shakai keizai kokumin kaigi, **Enerugii kanren shisetsu no richi taisaku** [Siting Policies for Energy-Related Facilities], Shakai keizai kokumin kaigi, Tokyo, 1981.

Shigen enerugii chō, **Dengen sanpō no gaiyō** [An Outline of the Three Laws], Shigen enerugii chō, Tokyo, 1982.

Shigen enerugii chō kōeki jigyō bu, **Dengen kaihatsu no gaiyō: sono keikaku to kiso shiryō** [An Outline of Power Plant Development in Japan: Plans and Basic Data], Tokyo, various issues, 1956-1982.

Shin denki jigyō kōza henshū iinkai, **Denryoku keitō keikaku to unyō** [Planning and Management of Electrical Systems], Denryoku shinpō sha, Tokyo, 1980.

Shigen enerugii chō, **Sōgō enerugii tōkei** [Energy Statistics], Shigen enerugii chō, Tokyo, various issues, 1959-1982.

Sōrifu tōkei kyoku, **Jūgyō kōzō kihon chōsa hōkoku** [Report on Employment Structure in Japan], Sorifu tokei kyoku, various issues, 1950-1980.

-----, **Nihon tōkei nenkan** [Japan Statistical Yearbook], Nihon tōkei kyōkai and Mainichi shinbun sha, Tokyo, various issues, 1950-1980.

Suzuki H., **Hamaoka genshiryoku hatsuden shō mondai ni kansuru shingi kai kaichō chōsa** [Deliberative Council Investigations on Problems Relating to the Hamaoka Nuclear Power Plant], Hamaoka genshiryoku hatsuden sho mondai taisaku shingi kai, Omaezaki, 1969.

-----, **Hamaoka genshiryoku hatsuden to watashi tachi no kurashi: sono anzensei to kangae kata** [The Hamaoka Nuclear Power Plant and Our Lives: Safety and a Way of Approaching Safety Issues], Denryoku shimpō sha, Tokyo, 1973.

Tanaka K., 'Genpatsu richi to chiiki shakai-hokkaido: iwanai' [Nuclear Siting and Regional Society: Hokkaido], in Inuta T. and Nagatani K., eds., **Chiiki funsō no kenkyū : jichi tai no yakuwari to gōi keisei no jōken** [Research on Regional Conflict: The Role of Local Administration and Conditions for Public Acceptance], Gakuyō shobō, Tokyo, 1981.

Toyoda M., **Genshiryoku hatsuden gijutsu dokuhen** [All You Need to Know About Nuclear Power], Oomusha, Tokyo, 1976.

Tsūshō sangyō shō, **Dengen kaihatsu tō ni tomonau sonshitsu hoshō kijun** [Compensation Standards Accompanying Electric Power Development], Tsūshō sangyō shō, Tokyo, 1963.

Tsūshō sangyō shō and Shigen enerugii chō, **Dengen sanpō kankei hōrei shu** [A Collection of Laws Governing the Application of the Three Laws], Tsūshō sangyō shō and Shigen enerugii chō, 1982.

Tsūshō sangyō shō kōeki jikyō kyoku, **Dengen kaihatsu tō ni tomonau sonshitsu hoshō kijun saisoku** [Regulations on Compensation Standards Accompanying Electric Power Development], Tsūshō sangyō shō kōeki jigyō bu, Tokyo, 1963.

Newspaper Articles

Asahi shinbun: enshu ban [Asahi: Enshu Edition]

Asahi shinbun: hokkaido ban [Asahi: Hokkaido Edition]

Asahi shinbun: kyushu ban [Asahi: Kyushu Edition]

Asahi shinbun: nagasaki ban [Asahi: Nagasaki Edition]

Asahi shinbun: shizuoka ban [Asahi: Shizuoka Edition]

Chubu denryoku shinbun [Central Electricity]

Chūnichi shinbun [Central Daily]

Denki nippō [Electricity Daily]

Denki shinbun [Electric News]

Denki shinpō [Electric mails]

Denki taimuzu [Electricity Times]

Enshu chūnichi [Central Enshu Daily]

Enshu yomiuri [Enshu Yomiuri]

Hokkaido shinbun [Hokkaido]

Hokkaido shinbun: shiribashi ban [Hokkaido: Shiribashi Edition]

Hokkaido taimuzu [Hokkaido Taimuzu]

Mainichi shinbun [Mainichi]

Mainichi shinbun: hokkaido ban [Mainichi: Hokkaido Edition]

Mainichi shinbun: nagasaki ban [Mainichi: Nagasaki Edition]

Mainichi shinbun: shizuoka ban [Mainichi: Shizuoka Edition]

Nagasaki shinbun [Nagasaki]

Nihon keizai shinbun [Japan Economic]

Nihon keizai shinbun: nagasaki ban [Japan Economic: Nagasaki Edition]

Nihon keizai shinbun: hokkaido ban [Japan Economic: Hokkaido Edition]

Nihon kōgyō shinbun [Japan Industrial]

Nikkan kensetsu tsūshin [Nikkan Construction]

Nikkan kōgyō shinbun [Nikkan Industrial]

Nikkei sangyō shinbun [Nikkei Industrial]

Sankei shinbun: enshu ban [Sankei: Enshu Edition]

Sankei shinbun: kyushu ban [Sankei: Kyushu Edition]

Seinichi shinbun [Seinichi]

Shakai shinpō: tōkai ban [Social News: Tōkai Edition]

Shizuoka minpō [Shizuoka Peoples]

Shizuoka shinbun [Shizuoka]

Shizuoka chūnichi shinbun [Shizuoka Central]

Shizuoka mainichi [Shizuoka Mainichi]

Tokyo shinbun [Tokyo]

Yomiuri shinbun: hokkaido ban [Yomiuri: Hokkaido Edition]

Yomiuri shinbun: kyushu ban [Yomiuri: Kyushu Edition]

Yomiuri shinbun: shizuoka ban. [Yomiuri: Shizuoka Edition]

List of Institutions Visited

Agency for Natural Resources and Energy

Atomic Energy Safety Commissiony

Central Electric Power Research Institute

Chubu Electric Power Company

Chugoku Electric Power Company

Clean Earth Party

Democratic Socialist Party

Economic Planning Agency

Electric Power Development Company

Environmental Protection Agency

Japan Congress Against Atomic and Hydrogen Bombs

Hamaoka Town Office

Hokkaido Electric Power Company

Hokkaido Prefectural Office

Hokuriku Electric Power Company

Institute of Energy Economics

Institute for Policy Sciences

Iwanai Fishing Co-operative

Iwanai Town Office

Japan Atomic Power Company

Japan Communist Party

Japan Socialist Party

Jittogata Fishing Co-operative

Kansai Electric Power Company

Kashiwazaki City Office

Kashiwazaki Prefectural Office

Kariwa Village Office

Kyowa Town Office

Kyushu Electric Power Company

Liberal Democratic Party

Ministry of Agriculture, Forestry and Fisheries

Ministry of Finance

Ministry of Home Affairs

Ministry of International Trade and Industry

National Council for Trade Unions

National Federation for Fishing Co-operatives

New Energy Development Organisation

New Liberal Party

Omaezaki Fishing Co-operative

Omaezaki Town Office

People's Energy Research Institute

Prefectural Council for Trade Unions

Sagara Fishing Co-operative

Sagara Town Office

Science and Technology Agency

Shikoku Electric Power Company

Shizuoka Prefectural Office

The Japan Siting Centre

Tohoku Electric Power Company

Tokyo Electric Power Company

Tomari Fishing Co-operative

Tomari Town Office